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OUR GREAT TRIAL OFFER.

To afford the opportunity to mechanics and others of examining and testing the value of The TRADE REVIEW AND WESTERN MACHINIST, to themselves, the Proprietor will send this Journal three months, for only FIFTY CENTS. postage paid, to any address in this country or Canada.

THE COPPER INTEREST.

The leading producers of copper appear on the whole to have succeeded in their policy of holding to an extreme price. The enormous output of the Calumet & Hecla lessened the power of its proprietary to shape the market. As the New York *Engineering and Mining Journal* observes: "The "smaller lake companies have not always acted in "harmony with it, but generally find it necessary "or expedient to co-operate with their great neigh- "bor. The policy of the lake companies for years "has been to contract with manufacturers for many "months at a fixed price, the sale being made with "the understanding that the value of the metal be "maintained at that rate during the period covered "by that transaction. Whenever the companies "found that it was likely that the consumption "could not cope with the quantity of copper made, "the estimated surplus was disposed of abroad at "whatever price it would fetch in the markets of the "world. In some instances this copper has re- "turned to this market when values have been "suddenly so much enhanced as to make such an "operation profitable. Occasionally, too, a specu- "lative element has proved a source of inconven- "ience and disturbance to those who were fixing "things." The excellence of the Lake Superior metal is all in its favor. Arizona copper rivals it, but Arizona copper mining on any scale is a comparatively new industry, and Indian disturbances have not only stopped operations at many mines, but frightened off additional capital that had been ready to be invested. The copper production of New Mexico promises well, but though offered at lower figures does not as yet affect the rates ruling for Lake Superior ingots; it affords, however, an available stock for consumers to draw on of which, in the interests of economy, they have taken advantage. Production from western and Mexican sources, will, however, at no distant date become so large that unless the lake companies resume their former course of making foreign shipments, offering their ore at lower figures abroad than they will take at home, prices must go down. The very extent of the consumption of copper invites to an increase of the plant of existing mines and the operating of others, the discovery of valuable deposits continually taking place, and production is not likely to be overtaken by consumption. Much depends on the position which western companies will take. The great Superior companies will seek their alliance in maintaining artificial rates through foreign shipments. They have a good market at home, and in the interest of so many trades which use up copper it is to be hoped they will not join in a policy, which, as we believe, can only be temporarily efficacious. The hope of consumers is the wide distribution of copper deposits. A combination extending from Michigan to New Mexico would seem hardly practicable. In 1881 the total production of copper was 71,700,000 pounds, of which Lake Superior region furnished 53,000,000, the western mines 5,050,000, and Vermont 2,500,000. The domestic consumption was about 64,000,000 pounds, and the excess of export about 7,000,000. England's consumption was but slightly in advance of our own figures, it being about 69,500,000 pounds. The estimate of production for 1882 is placed as high as 90,000,000.

IRON.

The iron strike continues to bring up iron stocks, which, notwithstanding the cessation of so many mills at Pittsburgh, Wheeling, the Shenango and the Mahoning valleys, prove sufficient for the requirements of users. Had the railway demand been maintained, and building operations not curtailed by the high price of labor and material, the result would have been different. No misgiving on the part of strikers appears to be expressed as to the sincerity of the determination of Pittsburgh manufacturers not to concede the terms demanded, for it is evident that any increased production of iron would result in sending prices so low that even at former rates of payment the production in the case of many manufacturers would be wholly unprofitable. Considerable orders have been given out the past few weeks by leading railroad companies for additional equipment of cars, and orders for tank purposes are large, but there is no ground for belief that we shall witness, the present year, anything like the activity in consumption of iron that prevailed last year. With mills now running there is an evident slackness. But for the curtailment of supply by the strikers, the lowering of freights from Liverpool to New York would have a tendency to weaken our market.

OHIO COAL DEPOSITS.

At the meeting of the Ohio Institute of Mining Engineers, held at Nelsonville, Professor Edward Orton observed that the coal measures of Ohio were accumulated around the margin of an ancient arm of the sea. The boundaries of this ancient gulf can be traced through Ohio, through several earlier stages with unmistakable distinctness. The Berea Grit is as plain a shore line as was ever left by a retreating sea. It is characterized by ripple-marks and worm-tracks throughout its entire extent. It was the northern and western boundary of the old gulf. At the beginning of the coal measures proper, more than half of Ohio was dry land. All of western Ohio and the northern portion of the State, as well, were now above the sea. The land was low and its only relief was produced by the erosion that had already begun its work upon it. There were no mountains, no irregular folds, no fractures of the strata. There is not a more orderly portion of the earth's crust than this 40,000 square miles that we call Ohio. When the earliest coal swamp was in process of formation, the shore of this sea was composed of quite different classes of materials. Long beaches of pebbles, worn on a shore that no man knows, but presumably from the southeastward where the appalachians already existed, transported by glacial ice, long beaches of this gravel alternated with the softer beds of the Waverly formation below or with the patches of limestone. The deposits of the coal seams below the Nelsonville coal at least were in the nature of marginal swamps. Coal vegetation grew where we find it. A coal seam is literally and truly a buried swamp. A swamp cannot exist in deep water. Swamps around islands in the gulf, if such islands existed, as well as around the main land, would give rise to coal seams under proper conditions. Such islands we find later in the series. The sporadic coals, the jumping seams, are accounted for in this way. But the earlier seams are characterized by a number of facts that imply the near presence of the sea. Many of these seams are covered, locally at least, by sharp sandstone, sometimes conglomerate. Whence came this material? Surely from the open sea. Strong currents are required to account for much of it. Mud or shale belongs to quiet and protected shores. The presence of marine limestones through the lower coal measures is conclusive proof that the sea was at hand. Take the lower Mercer limestone, for instance. It is crowded with the life of the ancient seas. Observations led to the conclusion that this coal was formed around a contracting sea. If the sea was subsiding, the lowest seams would be in interior and the highest would reach furthest inland.

LATEST CONSULAR REPORTS.

The United States Consular General at Rio de Janerio writes of the American trade to Brazil: "British and German steamers have been taking cargoes from this port to the United States, and our own sailing vessels went home in ballast or with light cargoes at low freights to save buying ballast. Under any circumstances the steamship has the preference of freight over the sailing vessels. This competition bears very hardly on the American line and in no wise serves our interests, as the rival steamers never come back to Brazil direct from the United States and it is the voyages from this port to Brazil which best advance the interest of our commerce. The profitable business which these foreign steamships obtain from the United States to England and thence to Brazil enable them to bear an unprofitable voyage from thence to the United States, which voyage, however, they are not compelled to make, if good business offers elsewhere." The regular communication by steam from New York to Brazil which we have enjoyed for over two years has had a beneficial effect on our trade with this country, and fortunately through the enterprise of John Roach, of New York, and the confirmation by the Brazilian Parliament of the contract of the Government for granting a subsidy, will be resumed. Consul Brooks, at Cork, Ireland, treats of discriminating dues against American vessels. "It is certain," he observes, "that with the load of consular, customs, pilotage, harbor and other fees added to the interest on the cost of original construction and on the expenses of deep-water ships under existing laws, the margin for profit in this business is very small, and the various competitive agencies alluded to are constantly narrowing even that small margin. Our coastwise trade is to some extent free from these extraordinary expenses and impositions of official fees. At the same time it is free from all foreign competition. This freedom will always enable it to thrive and commend it as a safe investment for capital." The report of Consul Duncan at Naples, contains the following apposite passage: "The late improvement in direct connection with New York through the Florio

steamers has already made considerable change in causing direct importations from the United States, and I have little doubt that in a short time many new articles of American production will find their way into South Italy, to the mutual benefit of both countries. As a favorable indication of this, one of the last Florio steamers arriving here from New York brought fifty-two cases of agricultural machinery and implements to a single house dealing in such articles in Naples." Naples has a large market for cottonseed oil, lard, canned meats, fish, oysters, lobsters, etc., but these come, as yet, almost entirely through large English houses, and are not known at the custom house as American. Our business with Alexandria, Egypt, has been knocked on the head by late events, but when affairs in Egypt shall be settled it is evident, by the representations of our Consul at that port, we may find fair scope for direct trade. At present, owing to the indirect routes by which our goods reach that market, we lose much of the national reputation that is due us. To every port we turn we find disadvantages arising from the limitation of American shipping. It is impossible that the country can long consent to abide by this state of things. The partial action of Congress in enlarging both the scope and the amount of ocean postal subsidies, will, it is to be hoped, be but the commencement of an intelligent and liberal course of policy that will cause our shipbuilding yards to re-assume their full activity, and foreign ports to be again crowded with our vessels, enlarging our trade and adding to commercial gains.

STOVE MANUFACTURERS.

There has been unnecessary competition and want of harmonious action among stove manufacturers, despite a National Association. That Association, as regards attaining its proposed ends, stands at a disadvantage with associations representing other trades. It would appear that the peculiar character of the stove manufacture interferes with the the establishment of any thing like a uniform scale. Style and mode of construction have each their special values, so also the reputation of certain makes. The percentage of profits was not, last year, so satisfactory as was desirable, due to the fact that contracts for iron were made early, coupled with the misgiving of manufacturers as to probable demand. This year early contracts tell in favor of stove manufacturers, iron having advanced since they made their contracts, and there being a certainty that this advance will be maintained. The problem which formerly presented itself for consideration as to what extent foreign iron would affect the consumption and price of American has been satisfactorily solved. The fact has been established that Scotch iron can be profitably used to a considerable extent in the manufacture of stoves. The members of the As sociation have more to fear from needless competition among members than from any hostile influence outside. There will be in the fall season a large demand for stoves. It cannot be profitable for any founder, in his eagerness to secure orders, to do so at prices which will not compensate, probably finding himself unable to supply the demand coming late in the season that would render a satisfactory return for the capital and labor employed. The Association will do much to cultivate the disposition to maintain fair rates. This union of a body of manufacturers, though only somewhat formal, is apt to engender a higher business tone.

THAT the supply of gas for heating in all our great cities is an eventuality no one can doubt. But before its general adoption it must be cheapened in production, and in order to do this the first point is the improved carbonization of coal. Within less than twenty years 8,000 feet of gas made from a ton of coal was considered excellent working, but it is now possible to make from 9,000 feet to 10,000 feet, or more, per ton or coal carbonized. Yet, notwithstanding the amended processes of condensing, scrubbing, purifying, and to some extent storing gas nothing has been practi cally accomplished in the way of distilling coal by passing it continuously through a retort with a constantly closed entrance, and thereby getting a larger yield of gas per ton of coal, and a uniform make of gas per hour, both as regards quantity and quality. Experiments, however, are being made with a view to bring to perfection an improved method of carbonisation on this principle. It may be readily conceived what a different place the retort-house would be if the drawing and charging of retorts were abolished. Improved carbonization will have a directly cheapening effect upon gas, and the increased scale of business that will follow will be another cheapening element.

MANUFACTURES.

TO MACHINISTS. MANUFACTURERS AND OTHERS.

THE publishers of THE TRADE REVIEW solicit items of information concerning manufacturing and other establishments in any part of the country, and all such items will be promptly inserted in these columns, free of charge. Facts are the only things needed; and all communications should be accompanied with the name of the contributor—not for publication—but as a guarantee of good faith.

Manufacturers, machinist and engineers are particularly requested to communicate any matters of interest relating to their specialties. No one need be deterred from sending any interesting facts in his own anguage, as all such contributions will be properly revised before sending to press.

OHIO INDUSTRIES.

THE Lane & Woodworth Patent Glass Roofing Works, situated in the northern part of Youngstown, connected by switch with two railroads, will be ready for operation in a few days. The buildings, factory, engines, presses and machinery are upon the most approved models, and will be capable of producing 10,000 pounds of glass daily, with facilities for enlargement to an almost unlimited extent. The mould shop is accommodated in buildings at the works. The company has a capital stock of $200,000 and will push this enterprise, which is an entirely new one, with a vigor which must place it in the front ranks of manufacturing enterprise. Roofs have already been made with the company's machinery and put on for tests, perfectly demonstrating the practability and value of the idea. One of blue and alabaster is on exhibition upon a building on Champion street, near Federal. It is formed of diamond shaped tiles, with supplementary tiles for eaves, comb, gables, hips and valleys, and is perfectly water-tight without the use of putty, cement or any other material. There are no nail holes, and the nails used for fastening are concealed from the weather. Curves of the tile give to them an equal bearing upon the roofing boards and lath, and secure perfect joints. Corrugations upon the upper surface serve to scatter the heat rays of the sun, rendering the roof much cooler than any other now in use. The roof, when in place is elastic, the tiles readily turning upon their flanges, thus accommodating themselves to any disturbance of position to which they may be sub jected. The tiles are colored blue, green, amber, alabaster, porcelain or any hue or tint desired. They are three-sixteenths of an inch thick and, aven when made of common glass, are much stronger than any slate used.

THE Forsyth Scale Company, Youngstown, was established in 1841 at Rochester, N. Y. In 1870 the company split and established shops at Waukegan, Ill, and Erie, Pa. In 1880 Mr. Charles Himrod, having bought out the Erie company, also bought out the Waukegan company, and knowing the superior manufacturing facilities of Youngstowu, interested Youngstown capital. The machine shops belonging to the old firm of Homer Hamilton & Co. were purchased, and a large foundry added, giving the consolidated companies ample room for manufacturing purposes. Their capital stock is $40,000. John Stambaugh is presi dent of the company, and F. R. Harris secretary. Their business is good and increasing, making a full line of counter, portable miners', wagon, and railroad track scales, besides letter presses and store and baggage trucks. They employ about fifty men, and their monthly pay roll amounts to about $2,500.

SPERRY AND RATTLE'S Talmadge sewer pipe works, Akron, has started. They are owned by George P. Sperry and W. J. Rattle, who have already an extensive business in the same industry at Cuyahoga Falls. The new structure is of brick, three stories high with basement and is covered with a slate roof. The main building is 60x156 feet in dimensions with an engine room 40x41 feet in size, adjoining on the east side. In the basement in a space 30x60 feet in dimensions, over which space the first floor does not extend, is the clay grinding room. In this room are four clay mills of the most improved pattern, made by Turner, Vaughn & Taylor, of Cuyahoga Falls, and a clay store room. Running along the side of the clay mills is an endless belt which carries the clay from the mills to the packer, where it is pressed into blocks, cut, and, by means of an elevator, carried to the floors above, where it goes to the sewer pipe press. A clay pulverizer will also be placed in this room. The engine is of 100 horse power.

MR. N. S. C. PERKINS, patentee and manufacturer of the American Tricycle, Norwalk, is filling large orders for these. He has brought the construction of his tricycles to an excellence in all points probably approached by no maker. The ease with which they are propelled is remarkable; at the same time attention has been given to secure wearing power and strength in mechanism. The tricycle for girls affords pleasant and healthful recreation; it is moved by the least motion of the feet, and is guided by levers conveniently placed to right and left of the rider. For children in city and country Perkin's tricycle affords an ever ready amusement. We design illustrating it in a forthcoming article. It is made in suitable sizes, according to height of rider.

THE Cope & Maxwell Manufacturing Co., of Hamilton, have under way for the Soldiers' Home, Dayton, one pair of water works pumping engines of the Tandem compound condensing duplex, or separate acting, plunger pump type, of 1,000,000 gallons capacity in 24 hours; the water to be delivered to a stand pipe of 20 feet diameter at the bottom, 18 feet in diameter at the top, by 132 feet high, through a 10″ force main. Each engine has its own air pumps and condenser, and is governed in its movement by Cope & Maxwell's patent hydraulic regulator, which confines the piston travel of the engine to the speed to which the regulator is set, under any conditions of service.

WORK in the North Amherst stone quarries at Berea is dull. Twenty men were recently discharged from Clough's quarry, fifteen from Worthington's ten from Nichol's, ten from Frost's, and so on. The strikes abroad probably interest the stone interest, especially among manufacturers of iron work who use grindstones. But the absence of competition among the large quarries, owing to their combination, tends to fix prices at a higher figure than many builders are willing just now to pay. Other causes, too, may enter in as factors in the general depression of stone.

AN illuminated programme just issued announces that Cincinnati will open its tenth industrial exhibition on September 6. The exhibits will be classified in eight departments as follows: 1, machinery; 2, minerals, metals, railroad supplies, hardware, stoves and heating apparatus; 3, tobacco, liquors, provisions, cereals, etc.; 4, household furniture, pottery and ornaments, etc.; 5, textiles, clothing, etc.; 6, scientific and educational; 7, fine arts; 8, horticulture. The exhibition will close on October 7.

THE wagon works of R. H., W. A., and A. H. Allen are about to be moved to Akron, they having purchased a building from the Austin Power Co., of Cleveland, known as the Tub and Pail Factory. The works will be in running order by the middle of August. The firm will make farm and platform wagons a specialty, and will start with a force of twelve men, which number will doubtless be increased before long.

YOUNGSTOWN capitalists are considering the feasibility of establishing a manufactory of cast steel machinery. Mr. E. L. Ford of New York, an experienced manufacturer, has been in consulta-

tion with capitalists during the week. No decision has yet been arrived at. A cash capital of $50,000 will be required if the project materializes.

THE firms of Akers Bros. and Harpman Bros., of Akron, have formed a partnership under the firm name of Akers, Harpman & Co., and have engaged extensively in slate roofing and the wholesale slate business. A force of experienced workmen is employed, and the slate used and handled by this firm comes from the finest quarries in the country.

THE Standard Rivet Co., Cleveland, are just commencing the manufacture of all kinds of rivets, both hot and cold, with machinery specially adapted to the various kinds of work. They have a capacity for hot works of about ten tons daily, and will make all sizes and styles of heads, including countersink.

THE Richie & Dyer Co., Hamilton, are active in building their new engine, which possesses all the advantages of thorough construction, durability of wearing parts, ease of management, and traction qualities not excelled by any competing machine. It is suitable for heavy hauling, for saw mills, and for quarrying.

THE Cummer Engine Co., Cleveland, which removed from Detroit, will soon occupy their new buildings, a machine shop 230x60, two stories, and foundry 220x60 on the corner of Lake and Cortland streets. They build an automatic steam engine, adapted to mill use and electric lighting.

AT the Lake Shore Railroad shops, Cleveland, they have in operation the machine for welding flue joints made by Hartz & Fix, 21 Champlain street, Cleveland. This machine is operated by two boys, and a memorandum shows that 200 tubes were cut and welded in nineteen hours.

THE Powell Tool Co., Cleveland, are able to produce in their new shop 50 per cent. more goods than formerly. They now occupy a whole block, and have an axe and forge shop 227x66, and 50 feet high, power for which is furnished by a 48x26 Corliss engine.

THE Grasshopper mill, owned and operated by the Arms, Bell & Co., Youngstown, has started its ten-inch mill and is now engaged in making its own iron from muck bar. The machinery works very smoothly. The product will be used in supplying their own nut and bolt machines.

THE strike at the Cleveland Rolling Mills has completely collapsed. A large number of union men have applied for work but a considerable pro portion have been rejected. Those admitted are required to sign an agreement that they will not be governed by the Union.

LAMSON, SESSIONS & Co., Cleveland, manufacturers of carriage, tire and stove bolts, are moving into their new buildings, which gives them double capacity. Their main building is 450x50 with four wings 50 feet long. Power is furnished by a 250 horse power engine.

THE Vulcan Iron Works, Toledo, are employing 80 men on full time. They melt up five tons of pig iron a day, and are busily engaged in constructing railroad excators, and have recently added about $10,000 worth of new and improved machinery.

W. H. WOOD & BRO., Martins Ferry, have just placed in their brick yard a Kennedy pressed brick machine, having a capacity of about 15,000 bricks per day. It will be put in operation next week, and the Messrs. Wood will make pressed brick a speciality.

COX & PRENTISS, Cleveland, have adopted the name "Cleveland Twist Drill Company," and are doing an increasing business in the manufacture of drills, reamers, cutters, etc. They have just filled the second order for drills from England.

THE total production of materials for building use, exclusive of stone work, which is necessarily classified with marble, in Cincinnatti, in 1881, was $1,635,700 against $1,195,700 in 1880, and the number of hands employed was 1,038.

BOMLER & Co., Cleveland, manufacturers of car wheels and heavy castings, have fitted a new building 80x50 with hydraulic press and new machinery for setting car wheels on axles. They employ 125 men, and use about 40 tons of iron per day.

THE Hotchkiss & Upson Co., Cleveland, are moving into new quarters west of Scranton avenue. They are adding new machinery, and manufacture carriage machinery, bridge and plow bolts. Capacity 150,000 bolts per day.

THE following companies have been incorporated: The Anderson Power Co., Findlay, capital $20,000; Raven's Cliff Mica Co., Cincinnati, capital $100,000; Stearns & Foster Co., Hamilton, capital $350,000.

THE shutting down of the Mahoning Iron Works, Youngstown, which are among the largest in the country, with the closing of the iron mills, stops the payment of nearly $3,000 a day in wages.

THE Enterprise Glass Co., Ravenna, which has resumed operation, is under the same management as formerly, that of Messrs. Krelis & Snyder, who have purchased a majority of the stock.

THE Ironton Hoe and Tool Works have their new hammers and other machinery in full operation, and are now manufacturing picks and mattocks, and filling their first orders.

THE National Machine Co., Cleveland, employ 100 men, and are running night and day to fill heavy railway orders for their bolt and nut machines.

AT the Akron Cutlery Works 700 to 900 dozen pocket knives are made per month. The goods are of a high class, and are in demand wherever known.

J. CHATTERTON & Co., Cleveland, have built a new shop 80x30, and filled it with improved tools for the manufacture of steam boilers.

THE Lawrence Iron Works Co., and the N. Y. & O. Iron and Steel Co., both at Ironton, are running their mills full double turn.

THE Colwell & Collins Norway Bolt Co., Cleveland, have completed new buildings and repairs, and are running full capacity.

THE Lake Shore Foundry, Cleveland, is melting fifty tons of iron per day, mostly for gas and water pipe and general castings.

THE Brush Electric Light and Power Co., Cleveland, have just contracted for two additional 250 feet masts for Cleveland.

THE Riverside Foundry Works, Cleveland, are running two cupolas, mostly on large work, some weighing fourteen tons.

THE Buckeye Glass Co., Martins Ferry, propose to erect a glass furnace to replace one of the large ones now in use.

Two new furnaces have taken the place of the old ones on the east side of the iron mills, Cuyahoga Falls.

PALMERS & DEMOODY, Cleveland, have started a new foundry at the corner of Leonard and Merwin streets.

THE Youngstown Malleable Iron Company will enlarge their capacity by erecting an addition 70x180 feet.

THOMAS MANNING, JR., & Co., Cleveland, employ 26 men in the manufacture of steam engines, etc.

THE sales of the Cincinnati Barbed Wire Fence Co. aggregate upwards of 250 tons per month.

TAYLOR & BORGIS, iron founders, Cleveland, melt on an average thirty tons of iron a day.

THE Dangler Vapor Stove and Refining Co., Cleveland, are doing a good business.

CLARK & Co. have commenced operations at their nut and bolt works, Youngstown.

THE building of the spike manufactory at Fostoria is being proceeded with.

THE Sandusky Basket Co. has been incorporated with a capital of $20,000.

SEVENTEEN tons of cheese were shipped from Garrettsville last week.

EAGLE Blast Furnace, Youngstown, is undergoing repairs.

THE United States Rolling Co. employ 800 men at Urbana.

CORRESPONDENCE.

FROM OUR SPECIAL CORRESONDENTS.

AKRON, July 26, 1882

Akron industries are growing with a rapidity that is seldom equaled, and a visit to some of her shops and manufacturing establishments bears one out in this opinion. The strikes at Cleveland and Pittsburg have been more or less detrimental, however, to some classes of business. The proprietors of the Akron Varnish Works claim that owing to the strikes they are not doing a business equal to their capacity in the line of varnishes used on iron ware, put in all other branches their business is good. The Knife Works here have had their share of bnsiness this year and claim that there is a good prospect for the coming season. This branch of the Buckeye Mower & Reaper Works are running at an increase of about 20 per cent. over last year. They have manufactured about 18,000 machines during the past year. They state that the future prospect for business is very encouraging and they will make an increase in their works to meet the demand for next year. The Boiler Works of J. C. Nicheil is running to its full capacity and has a large number of orders on hand. Messrs. Collins & Son, the large carriage manufacturers, report business better than ever before, and that the prospect for the future is good. The crops have been very large this year and therefore business in their line is looking up. They are running a full force of forty five men in their factory and manufacture a fine line of carriages, wagons and sleighs. The Stove Works of Messrs. Taplin, Rice & Co., are being improved by the firm who are doing a fine business. The Pipe Works, in the Sixth Ward are crowded with orders. The Cutlery Works are turning out some fine work and report business good.

CANTON, July 27, 1882.

Canton is one of our most important manufacturing towns in this section. Her shipments of all classes of machinery and manufactured articles are large and increasing. Messrs. Bucher, Gibbs & Co., the manufacturers of the celebrated Imperial and Ohio chilled plows, report an increase of business over last year. They are running their foundry to its utmost in anticipation of a heavy trade next year. A. Ball & Co., manufacturers of the Red Jacket plow, have done a trade about 25 per cent. larger than last year. They have made a new sulky plow which is becoming very popular, and of which they will turn out about 1,000 this fall and winter. Whitman & Barns have had a very busy season this year and are making preparations for a larger increase of business next year. The Canton Saw Works anticipate a very good season this fall and winter and report business good. The Canton Spring Co. have had a fair season, although they have not been rushed. They think of building an addition 40x60 and two stories high, to their already large works. The Canton Car Co. report that they are running 125 men on their work. They are building cars for Cleveland, Akron & Columbus road, also for the Oleny & Ohio R. R. and for the New Portage Strawboard Co. Their works cover seven acres of ground. The wood department is 220x40; bolt department 80x35; wheel and axle department, 80x43; setting up department 100x80; moulding shop 120x80 and a blacksmith shop 125x30.

INDUSTRIES IN GENERAL.

MASSACHUSETTS.

THE cotton compress recently constructed by the Bridgewater Iron Co., is said to be the largest machine ever built in this country. The machine was completed by the Bridgewater Iron Co., of Bridgewater. Over 600,000 pounds of iron have been used in its construction. The motive power of the press is an upright compound engine of two steam cylinders, one of which is 80 inches in diameter, and the other 100 inches in diameter. These cylinders, located at the top of the machine, are 70 feet high, and are operated at a working pressure of 150 pounds to the square inch, which results in making the effective power of the compress 6000 tons, 3500 tons more than that of any other cotton compress now in use. This press is expressly designed for preparing cotton for foreign shipment. By its use two or three bales of cotton will occupy but little more space on shipboard than is required for a single bale compressed in the ordinary manner.—*Boston Com. Bulletin.*

NEW HAMPSHIRE.

THE Stark Mills at Manchester are putting in an immense steam engine, to give them sufficient power in summer. The main shaft measures nearly eighteen inches in diameter. They are also putting in the foundation for the continuation of No. 3 mill, to connect with the canal building, about eighty feet.

CONNECTICUT.

THE Bradley & Hubbard Company, the largest chandelier manufacturing concern in the world, is about to erect a new brass foundry 40x250 feet.

NEW YORK.

A NEW and handsome manufacturing block of five stories has recently been completed on River street, Troy, by the enterprising firm of T. S. Suther & Son, on the site of their former building, which was burnt to the ground. They employ about a hundred mechanics in the working of plates. They have been very successful in blast furnace work, and are continually adding new machinery to accommodate fast increasing business.

AT the Albany iron works on Monday last, a ¾-inch rod 263 feet long, free of flaw and plump from end to end, was turned out. It is forty feet longer than any rod ever before produced in this or any other country, the next largest having been made in Pennsylvania. The manufacture was experimental to determine how long a rod could be rolled. The rolls moved with lightning speed to carry the rod through before it cooled.

ACCORDING to the census, the total number of manufactories in New York city in 1880 was 11,060, including 540 printing and publishing establishments. The total capital invested was $157,581,747; greatest number of hands employed at any one time during the year, 262,459; of which number 133,998 were males above 16 years of age, and 63,482 were females above 15 years of age, which would leave 64,989 boys and girls below the ages of 16 and 15 years respectively among the employes of the city. The total amount of wages paid for the year ending June 30, 1880, was $89,513,934. The total value of materials used for the year was $267,042,236. Total value of product, $435,421,102.

PENNSYLVANIA.

ON Monday last, the mill of the Union Tube Works, New Castle, started on double turn. The company are getting a full supply of iron from the eastern part of the State, and not being affected by the strike, are filling orders promptly.

IN the rolling mills of Pittsburgh there is a cash capital invested of $19,020,000, with a product amounting to $30,242,257. Previously to the strike there were 18,905 hands employed in these mills. In blast furnaces and othea manufactories in iron, there is a capital of $5,157,000, a product of $9,286,493, and 2511 hands employed. In steel, the capital is $10,170,000, the product $18,378,836 and 7060 hands were employed in Pittsburgh. Coal trade, the capital is $15,552,000, the products $12,208,306, and the number of hands 17,962. To this may be added the coke industry. There is a capital of no less than $10,854,500 invested in this comparatively new trade, with a product of $4,423,559, and 5659 hands. These two articles together yield a product of over $16,000,000, upon a capital of little over $26,000,000. In boating and shipping a capital of $7,447,000 is invested, yielding a product of $2,400,000, and 3260 hands are employed. The glass industry is one of the oldest and one of the most valuable manufactures. There are 59 factories, with a capital of $5,985,000, a product of $3,842,583, and employing 6442 hands.

THE Tanite Co. has sent abroad to the order of a foreign government, a solid emery wheel, 36 inches in diameter, 8 inches in thickness and weighing 800 pounds. It is now manufacturing to order a machine for this wheel.

THE Pennsylvania Steel Company, at Steelton, employ 2,200 hands with a monthly product of 11,000 tons steel rails, 1,000 tons of steel billets, 250 tons of switches and 600 to 800 frogs. They are building two Siemens melting furnaces, capacity twenty tons per heat, two blast furnaces, 20 feet bosh, shop 80x400 feet for frog department, merchant mill with two trains for rolls.

MICHIGAN.

THE Martel Furnace completed its 47th week of active work last Saturday, on which date 250 working days had been put in, with an output of 10,000 tons of pig iron to show for it.

ILLINOIS.

THE Chicago Telegraph Supply Company are at work on a large order for 1,500 electrical instruments for the Western Union Telegraph Company, besides other orders. They have just completed a telegraph line for the Board of Trade Telegraph Company, of Chicago, to run to St. Louis. In this order 1000 miles of wire have been used. The contract amounted to $35,000.

Joseph B. Read, manufacturer of machine tools, Cairo, has recently enlarged his foundry and machine shop, placing in some $10,000 worth of new machinery, and now employs 25 men, and reports a fair business.

NEW car wheel works are to be established at Moorehead.

THE Eureka Wire Works are a lately established organization in Chicago, and their business is developing so rapidly that they will soon enlarge their works. They manufacture riddles, wire cloth, steel wire brushes and wire goods generally, and consume two tons of wire per month. They recently put in new machinery for the manufacture of steel brushes.

THE managers of the American Tin Plate Works, at South Chicago, expect to do a business of $1,000,000 per year.

THE Hopkins Manufacturing Co., Chicago, makers of reapers and mowers, have increased their capital from $200,000 to $1,250,000.

GEORGE A. Wrisley & Co., of Chicago, is the title of a company recently incorporated, with a capital of $25,000, for the manufacture of laundry and toilet soaps.

Our Production of Bessemer Steel in 1881.

We have received complete statistical reports from all the Bessemer steel works in the United States, giving their production of ingots and rails in 1881.

The total quantity of Bessemer steel ingots produced in the United States in 1881 was 1,539,157 net tons, or 1,374,247 gross tons. The production in 1880 was 1,203,173 net tons; in 1870, 928,972 net tons; in 1878, 732,256 net tons. The increased production of 1881 over 1880 was 335,984 net tons, or 28 per cent; over 1879 it was 610,185 net tons, or 66 per cent; and over 1878 it was 806,931 net tons, or 110 per cent. The production of Bessemer steel ingots in this country in the ten years from 1872 to 1881 has been as follows, in net tons:

YEARS.	NET TONS.	YEARS.	NET TONS.
1872	120,108	1877	560,587
1873	170,652	1878	732,226
1874	191,933	1879	928,972
1875	375,517	1880	1,203,173
1876	525,995	1881	1,539,157

Bessemer steel ingots were produced in 1881 by 13 works, of which 7 are in Pennsylvania. Two new works, both in Pennsylvania, produced Bessemer steel in 1881 for the first time. These works are those of the Pittsburgh Bessemer Steel Company, Limited, located at Homestead, near Pittsburgh, having two converters, and the Pittsburgh Steel Casting Company, of Pittsburgh, having but one converter. The Pittsburgh Bessemer Steel Company, Limited, made its first blow on March 19, 1881, and the Pittsburgh Steel Casting Company made its first blow on August 26, 1881. Some extensions were made to old works in 1881, and two new works are in course of erection now. A comprehensive exhibit of the Bessemer steel works of the country completed and in progress is as follows:

NAMES OF COMPANIES.	CONVERTERS. Completed.	Building.
Albany and Renselaer Iron and Steel Co., Troy	2 6¼-ton	.....
Bethlehem Iron Co., Bethlehem	4 7-ton	.....
Pennsylvania	3 6¼-ton	.....
Steelton	3 3-ton	.....
Lackawanna Iron and Coal Co., Scranton	2 7½-ton	.....
Cambria Iron Co., Johnston	2 6-ton	.....
Carnegie Bros. & Co., Limited, Bessemer	3 10-ton	.....
Pittsburgh Bessemer Steel Co., Limited, Homestead	2 4-ton	.....
Pittsburgh Steel Casting Co., Pittsburgh	1 7-ton	.....
Cleveland Rolling Mill Co., Cleveland	2 6¼-ton	.....
North Chicago Rolling Mill Co., Chicago	2 6¾-ton	2 10-ton
Union Iron and Steel Co., Chicago	2 5½-ton	.....
Joliet Steel Co., Joliet	2 5½-ton	.....
Vulcan Steel Co., St. Louis	2 6¼-ton	.....
Scranton Steel Co., Scranton	.....	2 4-ton
Colorado Coal and Iron Co, South Pueblo	.....	2 5-ton
Total	31	6

Only 30 converters were in use in 1881, as Carnegie Bros. & Co., Limited, have substituted a 3-converter plant since the close of the year for their 2-converter plant. The new works at Scranton, Pa., and South Pueblo, Col., and the extension of the North Chicago Rolling Mill Company's works will probably be in operation some time during the first half of 1882.

The American producers of Bessemer steel rolled 1,253,128 net tons, or 1,118,865 gross tons, of Bessemer steel rails in 1881. But this is not the whole quantity of Bessemer steel rails rolled in the United States in that year, as quite a large quantity, estimated in the neighborhood of 100,000 gross tons, were rolled by iron rail mills from imported blooms. The total production of Bessemer steel rails in 1881 was therefore about 1,200,000 gross tons. The following table shows the growth of our production of Bessemer steel rails in ten years since 1872, the qualifying statement in regard to 1881 being borne in mind.

YEARS.	NET TONS.	YEARS.	NET TONS.
1872	94,670	1877	432,164
1873	129,015	1878	550,398
1874	144,944	1879	683,941
1875	290,863	1880	954,4.0
1876	412,461	1881	1,365,129

—*Bulletin of the Iron & Steel Association.*

NEW STEAM DIGGING ENGINE.—A new steam digging engine of enormous power was exhibited at work in England. It is the invention of Mr. James Parker, and manufactured by Proctor & Co., of Stevenage. This curious apparatus consists of a digger shaft with three cranks—cranked at an angle of 120 degrees—placed at the front end of a powerful portable engine. Each crank actuates a digging fork 4 feet wide, with eight prongs bolted to the angle iron fork head. From each fork a lever arm rises, and at the top it is connected to a short oscillating link lever. It is this curved lever arm and link lever that guides the movements of of the fork in digging. By means of the slot-articulation of the link lever to the fork arm, the path points of the prongs of the fork are timed with the greatest certainty. For travelling through gates, and on the road, the two side diggers are removed. The weight of the steam digger is about seven tons, and is mainly supported on the rear wheels. It is utilized in driving the digging forks into the ground, thus taking most of the pressure on the wheels off the land; and as the bearings of the digger-shaft form a fulcrum to the three digger forks, and as the spur gear leverage is most effective, nearly twice the power applied in turning over the three spits—12 feet wide by 12 inches by 6 inches—is thus applied in forcing the engine forward, in addition to that of steam by spur gear. The digger-shaft is driven by spur gear from the crank shaft of the engine, and in an experimental trial made 45 revolutions per minute, the driving wheels advancing 45 feet in the same time, so that each fork in one rotation of the digger-shaft turned up a slice 4ft. long and 1ft. broad, with the utmost regularity, the three forks doing about 7½ acres per day of ten hours, at a cost estimated something less than 5s. per acre. This machine, with the forks taken off, may be utilized as a traction engine for haulage use on the farm, or for driving a threshing machine.

WOOD SCREW FOR SOFT WOODS.—At the Engineer's Club, Philadelphia, Mr. Geo. Burnham, Jr., describeda wood screw, in which the thread, instead being cut, is formed by passing the blank through a series of rolling, working against stationery dies. The first set forms a slight ridge only, the second deepens it, and so on until the perfect thread is formed. The thread of the finished screw is slightly larger in its outside diameter than the unthreaded neck of the screw, and the point is turned conical and left unthreaded, thus differing from the ordinary cut screw, in which the thread continues to the extreme point. The object of this construction is to adapt the screw to the present mode of using it in soft woods; that is, driving it part way home before using the screw driver. Bolts are also made in the same way, the thread appearing to the eyes as perfect as a cut thread. It is claimed that a bolt made in this way is ten per cent stronger in the thread than a cut bolt.

COTTON SEED OIL.—The method of making cotton oil is as follows: The seed as originally received from the planter is first reginned, producing an inferior cotton, which finds ready sale for about two cents less per pound than the ordinary grades. The seed is then stripped of the hulls, which are utilized for fuel, the ashes making a strong fertilizer. The oil is obtained by crushing and pressure, the solid residue, or oil cake, being a marketable article for feeding cattle. The oil after refining, is mainly exported. Large quantities are doubtless returned to this country as olive oil, which refined cottonseed oil much resembles in taste and quality. It is used for illumination, for cooking purposes instead of lard, as an adulterant for dearer oils, and in manufactures as the basis of nitro-glycerine.

ITEMS OF INTEREST.

CHINA consumes more opium than her tea crop sells for.

SOUNDS may be deadened by inserting saw-dust between double plank flooring.

A CLOCK made of paper is the latest acquistion to the field of mechanical ingenuity.

A LARGE amount of hay is being shipped from Canada to the United States since the duty upon it has been removed.

A FLAG stone has lately been quarried in Waterville, N. Y., for which $5,000 has been offered in New York city.

THE oyster trade of the United States employs nearly 53,000 persons, and the annual product exceeds 22,000,000 bushels.

A DRUM manufactory in Massachusetts, established in 1853, has converted during that time 30,000 sheep skins into drumheads.

THE latest regular time known to be made by the passenger trains from Jersey City to Philadelphia, 90 miles, was 1 hour 50 minutes.

COTTON crop has improved since June 1, though its general average at this time of the year has not been lower in the past ten years excepting 1873 and 1874.

THE petroleum produced in this country since 1859, when the first well was opened, has added $1,500,000,000 to the wealth of the nation.

ONE of the latest of canal projects is that of a waterway between Liverpool and Manchester to cost $25,000,000. It would render Manchester accessible to sea going vessels.

THE new laws reducing dues and differential duties on imported articles at Cuban ports, went into force on July 1. The custom houses will return to importers any excess collected since that date.

A NEW use for glass has recently been developed in its substitution for marble tops of tables and pressing cases. A Pittsburgh firm has turned out slabs of glass that are said to be a perfect imitation of the latter material, while they admit of decorations of various designs, both in form and color.

IT is decided by the United States Circuit Court for Iowa that a delivery of goods to a common carrier, though not designated by the purchaser, is a good and perfect delivery to the latter. The carrier is for that occasion the purchaser's agent The possession after such delivery is in the purchaser, and the goods are at his risk. The lien of the vendor for the price is, upon the delivery to the carrier, lost by reason of the fact that the possession has been transferred from him to the purchaser.

MESSRS. Siemens & Halske, the well known electricians, of Berlin, Germany, have recently built a factory in St. Petersburgh, Russia, for the manufacture of cables and other matters connected with electricity. They expect to be able, in this factory, to prepare some 2000 miles of submarine cable every year.

THE total prodution of zinc in Europe amounted to 203,430 tons in 1880, of which Germany produced 99,405 tons, or nearly half, two-thirds coming from the Upper Silesian districts. After Germany comes Belgium, with 65,010 tons; then England, with 22,000 tons; France, 13,715 tons; and Austria-Hungary, 3,200 tons.

THE production of sulphuric acid has recently been so much encouraged by the New Zealand Government, who offered a bonus to manufacturers, that it has been impossible to find a market for the product.

AT a recent meeting of the directors of a cable company operating in Chinese and Australasian waters there was exhibited a section of cable damaged by the toredo. So destructive was this gutta percha borer that the company had been put to an expense of $40,000 a year in taking up damaged cables; to save this outlay they were now putting down a ribboned cable at a cost of $300,000. A four years' trial had demonstrated that by covering the cable with a brass tape or ribbon their attacks could be successfully resisted.

A STRONG and durable article of belting is made at Oakland, California, out of the entrails of sheep. The entrails, which will average about 55 feet in length, are first thoroughly cleaned and then placed in vats of brine, where they remain some days. When thus prepared they are not much thicker than a piece of common cotton twine, and will sustain a weight of about ten pounds. The fine strands are then woven together.

MECHANICAL RECEIPTS AND ITEMS.

Increased Uses of Plumbago.

The great variety of uses to which any particular mineral is put is one of the marked features of the present time. No sooner is one use or purpose discovered than forthwith experiments are applied to discover new uses. Plumbago is an instance of this. Chemically pure plumbago is a form of carbon, and the chemist knows it as such. Popularly it is known as black lead, from its metallic red-gray lustre. It feels very unctuous to the touch. It neither melts, softens nor is in any way changed by the highest temperatures, provided the access of oxygen be prevented. On this account it is valuable for crucibles, which withstand sudden alterations of temperature. Formerly it was only applied to the manufacture of black lead pencils and the cleaning of household grates; now it is extensively used for lubricating machinery; also for piano keys, the pivots of large clocks, &c., and particularly for wooden cog wheels. It is never found pure. To purify it, it is washed after being powdered, and sifted into different degrees of fineness. An increasing use of plumbago is for founder's blacking, which is used as a facing powder for sand mould; it is also used to coat the mould of loam castings as a thick paste, for coating patterns, and for throwing on the surface of hot metal in the ladle to prevent too rapid cooling.

Galvanizing with Liquid Zinc.

The common process is to dip the iron in a zinc bath, which is kept liquid in an iron bath. This offers the inconvenience that melted zinc dissolves the iron very quickly, and the bath becomes useless after a certain time. Neujean avoids this inconvenience by constructing the vessel of a material which resists the action of melted zinc. For small baths he uses fire proof sandstone For larger quantities he constructs ovens, the insides of which are covered with a mixture of coke dust, pulverized ore proof stones and fire-clay, which resist the chemical action of zinc. This oven is heated with the gases from a furnace which is at a distance from the metal bath. To prevent any loss of zinc through a rupture in the sides of the oven this is coated with sheet metal. Openings are provided at the top for introducing the objects which have to be coated. The plates are first passed through hydrochloric or dilute sulphuric acid; then washed in water and brought into a neutral bath containing a double chloride solution of zinc and ammonia, and then exposed to heat. A layer is thus formed which protects the object till it is dipped in the metal bath. The surface of the molten zinc is covered with ammonia, containing some common salt and chloride of lime. The pieces are agitated when in the zinc bath, where they are left till they acquire the required coating. When taken out they are rubbed with sawdust.

Making of Castings.

Pig metal holding about 2 per cent of copper, gives sharp castings which are dense and soft, if there has been no chilling. The outside coat is frequently of nearly pure copper. When the gases arising from a charcoal dust parting are to be avoided, we may use shifted ashes instead. Sometimes soap and ashes are employed, but soap will produce gaseous products. Sharp castings are obtained from cast-iron holding too much phosphorous to be good for puddling or for castings requiring strength. Such metal is very good for ornaments having no strains to bear. The excess of carbon in too highly graphitic pig metal may be burned off by the oxygen of pure and rich iron ore, projected in fine powders through the tuyere of the cupola, one or two hours before tapping the metal. When it is desired to give a smooth surface to large castings in green sand, the dusting with charcoal dust is dispensed with. Instead of that the print is painted over by means of a brush with a mixture in water of ¼ plastic clay and ¾ charcoal dust. A further polish may be given with an iron tool. Thin castings are often chilled by the mould, entirely or in some parts only. In order so remove the brittleness, and allow them to be worked with the file and tools, they are annealed in furnaces The oxidation of their surface is prevented by heating the castings enough to bear handling, and covering their surfaces with coal-tar, or with a mixture of lampblack and linseed oil. They are then put in the furnace, which is gradually brought to a red heat, and slowly cooled. We have frequently annealed small castings in the coals of an ordinary kitchen fire, without previously painting them over. After half and hour of red heat, followed by slow cooling, the oxidation was superficial only.

USEFUL RECEIPTS.

OXIDIZING SILVER ARTICLES.—A very beautiful effect is produced upon the surface of silver articles, technically termed oxidizing, which gives the surface an appearance of polished steel. This can be easily effected by taking a little chloride of platinum, heating the solution and applying it to the silver where an oxidized surface is required, and allowing the solution to dry upon the silver. The darkness of the color produced varies according to the strength of the platinum solution from a light steel gray to nearly black. The effect of this process, when combined with what is termed dead work, is very pretty, and may be easily applied to medals and similar objects. The high appreciation in which ornaments in oxidizing silver are now held, renders a notice of the following processes interesting. There are two distinct shades in use—one produced by a chloride and which has a brownish tint, and the other produced by sulphur, which has a blueish-black tint. To produce the former it is necessary to wash the article with a solution of sal ammoniac; a much more beautiful tint may, however, be obtained by employing a solution composed of equal parts of sulphhate of copper and sal ammoniac in vinegar. The fine black tint may be produced by a slightly warm solution of potassium or sodium. The chloride of platinum mentioned above is easily prepared as follows: Take 1 part nitric acid aud 2 parts of hydrochloric(muriatic)acid; mix together and add a little platinum; keep the whole at or near a boiling heat; the metal is soon dissolved, forming the solution required.

IMPROVED BLUE PROCESS OF COPYING DRAWINGS OR TRACINGS.—Take forty grammes citrate of iron and ammonia, forty grammes of red prussiate of potash, three quarters of a litre of distilled water; put this mixture into a bottle, preferably a stone jug which is glazed, or into a glass bottle which has been painted with black asphaltum varnish, or other black paint. It must be kept away from the sunlight or away from the strong light, as the action of light changes the mixture. After being thoroughly dissolved, spread this solution upon the drawing paper with a wide, camel's hair brush evenly and quickly, taking care to keep the prepared paper covered or away from the light while drying and when dried; as soon as ready, lay the tracing, which may be made upon transparent muslin, or transparent paper for that matter, over the prepared paper, covering it with a clean piece of glass, pressing the surfaces slightly together, and expose to the sun-light for not less than fifteen minutes; if the back ground is wanted darker, expose it for twenty or thirty miuutes. When the tracing is taken from this prepared paper, wash off the paper immediately and cleanly, leaving it to dry. The lines will appear distinctly white upon a medium or deep blue, according to the length of time it has been exposed to the rays of the sun. Don't attempt to copy except when the sun light is strong and clear. It is well to have a cushion of a quarter or half an inch in thickness, of different sizes, where much copying is to be done, and to have a piece of glass from an eighth to a quarter of an inch thick, so that when it is laid upon the cushion it will be elastic enough to press the surface of the tracing strictly close to the glass.

TO TAKE IMPRESSIONS OF WRITING.—Well mix three pints of jet-black writing ink and one pint of glycerine. This, if used on glazed paper will not dry for hours, and will yield one or two fair, neat, dry copies, by simple pressure of the hand in any good letter copy-book. The writing should not be excessively fine, nor the strokes uneven and heavy. To prevent "setting off," the leaves after copying should be removed by blotting-paper.

PRACTICAL MECHANICS.

Saw Filing.

The more valuable the material and the greater the cost of power, the thinner the teeth should be; although, in general, the harder the material the thicker the teeth, to stand the greater strain. The more fibrous and porous the material, the greater may be the spacing, and the greater the necessity of deep throat or gullet. The more gummy the material, the greater the need of "set" or side clearance. The softer the material, the more depth, gullet, hook and "rake" may be given. The higher the speed the greater the necessity for rounding the gullet.

In ripping fibrous material, the fibres are severed only once at a strike, while in cross-cutting, each fibre is cut off in two places at a stroke. The face of the file should be half as wide as the length of the face of the tooth. "Increment cut" files, or those in which the distance increases from point to heel, are claimed to work cleaner and easier than those in which the spacing is regular. Hand-cut files are claimed to work better than any machine-cut, except the "increment-toothed." Many styles of special teeth are best sharpened with files of special sections made on purpose for them; and some files cannot be sharpened with any other than special files. Gumming may be done with punches; rotating steel cutters, or emery wheels. "Set is of two kinds; "spring" or "bent" set, and "swagged" or "spread" set. Bent set teeth cut upon only one side; spread set teeth cut upon both sides, unless they are either bent or "sheared" as well as swagged. Each method of setting has its advantages and disadvantages, according to the conditions. Hand filing generally has the advantage of convenience in time and place. Machine filing has the advantage of greater regularity, ease and speed, and cheapness of work. Hand filing may be rendered more regular by the use of file guides. The remarks may be made concerning the relative merits and demerits of hand and machine setting, as in reference to hand and machine filing.

"Jointing," (also called "rounding," when applied to circular saws), is bringing the points of all the teeth down to the same line, so that no one tooth shall project lengthwise beyond the others, and thereby receive undue strain. It is generally performed with a flat or "mill" file, although it may be done with a plane rubber of emery or corundum, or a wetstone. It is best effected with the saw mounted in a special but simple jointing frame, or its equivalent. It is a very necessary operation. "Side-jointing" is a corrective of irregular setting, and prevents any undue side projection of any tooth or teeth beyond the rest. It is more effective with swagged than with those bent for set. Saw teeth should be filed, set and jointed frequently, and gummed at regular and not widely distant times. The keener and more regular the teeth, the cleaner aud easier they will work. The screeching of saw filing is proverbial, and yet unnecessary. A saw properly clamped and rightly filed need not "screech" under the operation. The blade must be firmly held close to the bottoms of teeth, and the file held firmly against the teeth. Rubber, leather, or even soft, thick pasteboard, between the blade and the jaws of the clamp, will absorb most of the vibration and render the operation more nearly noiseless. Saw filing to be effected regularly, neatly and rapidly, and with minimum wear of files must be gone about in a systematic manner, in order that no tooth may be omitted or gone over twice. For instance, the faces of every other tooth may be gone over in regular succession, then either the backs of those teeth, or the faces of the intermediates, and so on. In some cases the file is so shaped and held as to sharpen the back of one tooth and the face of the other one behind it. This frequently occurs with such small teeth as have no curved outlines, and is especially handy where the angle of the gullet is 60 degrees, as is generally the case where the throat is sharp cornered. A saw file cannot well be too hard nor too sharply cut. To preserve its cutting powers it should not be so held and used as to strike the teeth against the edge of the saw tooth. It should not be thrown down carelessly nor knocked about among other files or tools. The corners are particularly liable to be stripped in the angles between the teeth. A saw cannot well be too hard if it is properly filed and used. Hardness is independent of "temper" or "elasticity." With the choice of teeth for special purposes, this article will have little to do.—*Robert Grimshaw in the Wood Worker.*

Case-Hardening.

By the term "case-hardening" is meant that process by which the surface of iron is converted into steel. The art of case-hardening is a very useful one, and should be thoroughly understood by every smith and worker in metal. By case-hardening the surface of iron may be made harder than the hardest steel, and still retain all its malleability. One of the prime requirements in case-hardening is, that the article shall be well polished. If the iron is not quite sound or shows ash-holes it is hammered over and polished again. The finer the polish which is imparted to the surface, the better will be the results in case-hardening. The articles are next imbedded in coarse charcoal powder in a wrought-iron box, which should be air-tight. Sometimes, instead of a wrought-iron box, a pipe is employed. This is really preferable, because it can be turned, thus allowing the heat to be applied more uniformly. After the articles have thus been prepared, the box or pipe is exposed for some twenty-four hours to a gentle cherry-red heat. Sometimes a flue steam boiler is used for this purpose, or the heat may be obtained in any other place where a fire is maintained uniformly. By exposing the articles to the heat for the period named, a hard surface of about one-eighth of an inch in depth is obtained. If so much time cannot be given to the operation, or if deep hardening is not required, the articles may be imbedded in animal charcoal, or in a mixture of animal charcoal and wood charcoal and exposed for a much less period of time. Four or five hours will be found sufficient to make a good surface of steel. It is frequently necessary to case-harden a single article, which necessitates a very different operation from that we have just been describing. The charcoal is finely pulverized and mixed into a paste with a saturated solution of salt. The tool, whatever it may be, is then well covered with paste and dried. Over the paste is laid a coating of clay moistened with salt-water, which is also gently dried. The article thus prepared is now exposed to a gradually increasing heat, until it is brought to a bright red, but not beyond it. This heat will be found sufficient to give a fine surface to small objects. In all cases the article is plunged into cold water, when it has been heated the proper time and up to the proper degree.

A quick mode of case-hardening small objects sometimes employed is that in which prussiate of potash is employed. The iron is well polished and heated to a red-hot heat. It is then rolled in a box containing powder of the yellow prussiate of potash; or, instead of being rolled, the powder may be sprinkled upon it. In either case, the powder will melt on the surface. The iron is then heated to a bright red and is plunged into cold water. The powder of the prussiate of potash to be used for this purpose is obtained by exposing the crystals to a gentle heat in an open iron box or pot, for the purpose of evaporating the water contained in them. The remainder will be a white powder.

INDUSTRIAL SCIENCE.

Structural Steels.

An important consideration in welding steel is the heat. While it is impossible to give any specific rules on this point, the general rule, which will be found to hold good in all cases, is not to heat the steel any higher than is absolutely necessary to effect a weld—the higher the steel is in carbon, the lower the heat at which it ought to be worked—and next not to finish the operation at too low a temperature. It will, therefore, be best to work the steel as rapidly as possible, reheat as often as is required to prevent working or finishing cold, and anneal immediately after welding the whole piece—not only the immediate vicinity—containing a weld, at a heat higher than that at the finishing.

In the manufacture of eye-bars the hydraulic upsetting process will without doubt, be found to give the best results, yet the writer has no hesitation in saying that the eyes may be formed by welding, if done by experienced hands who understand the heating and treatment of steel, without any greater risk of imperfect welds than there is in iron. The danger from welding is no greater in steel than in iron, and the source is the same in both—namely, bad workmanship.

As regards the enlarging of the ends of round bars for cutting screw-threads by upsetting, it is not to be recommended. The better practice will be found to be to cut the threads directly on the rolled bar, and compensate for the loss in strength by increased diameter of the whole bar, rather than to resort to upsetting. While this is not practical in iron, it is in steel, as the far greater strength of the material admits of it with but trifling increase of diameter.

As to the effects of punching and shearing that affect sensibly the tenacity and elasticity of steel, these have been long recognized, but to more recent investigations is due the establishing of the fact that these effects are purely local, and can be therefore corrected, not only by annealing, but also by other and simple mechanical treatment. The importance of this discovery to the adaptation of steel to riveted work can hardly be estimated. The impracticability of making use of the corrective agency of annealing. in riveted-girder work, for instance, is too self-evident to need discussion, while on the other hand, to resort to drilling rivet holes instead of punching them, to avoid the evil effects of this latter as recommended by Sir Edward J. Peed, enhances the price of the steel considerably. The experiments of Lieutenant Barba, made at L'Orient, conclusively established the following facts, viz.: 1. That the effects of punching and shearing are essentially local, and spread only over a restricted region, less than .04 inch on the edges of the punched or sheared parts in plates less than .5 inch thick. 2. That the annealing will correct the alterations caused by shearing or punching. 3. That the removal of about .04 inch of the metal from the punched or sheared edge will destroy the effects of punching or shearing and bring the metal back to the state it would be in if drilling or planing had been resorted to in the first place. Tests made at the Watertown Arsenal with open hearth steel plates, to establish the comparative value of drilled, punched and punched and reamed holes, etc., afford confirmation of the above.

Utilizing Anthracite Coal Dust.

The problem of utilizing for fuel the enormous accumulations of coal dust in the anthracite regions of Pennsylvania was partially solved some years ago by a company which established works at Rondout, under the auspices of the Delaware and Hudson Canal Company, and is making large blocks of pressed fuel for the use of steamboats snd locomotives. A single concern like this might work half a century, however, without making any sensible reduction in the masses of material piled up near the mines. Quite recently a further step has been taken in the same direction, and one of even greater importance, by a Philadelphia inventor, Mr. E. F. Loiseau, who after thirteen years' persistent effort, has at last got machinery in operation which converts the coal dust into egg shaped lumps. suitable for combustion in ordinary stoves. The difficulty in treating anthracite dust for fuel is twofold. First, there must be mingled with it some binding material which will hold it together in lumps while it burns, for if the lumps crumble before combustion is completed the grate will be clogged with the dust and the draft stopped. Second, the process of manufacture must be so cheap as to bring the coal dust fuel in competition with coal at the lowest rate coal is sold. American inventors who have grappled with this double problem have had little aid from European experience. Pressed fuel is largely used in Europe, but it is made from bituminous coal dust, which can easily be rendered adhesive; and besides, the price of fuel is so much greater there than here that the manufacturer of the artificial article has a larger margin to count upon between the cost of his product and that of coal. Mr. Loiseau first tried clay as a binding substance, and coated his egg shaped lumps with lime water. The fuel thus prepared burned well, and was exhibited at the Centennial in a separate building near Machinery Hall, but a little experience showed that it would not stand the effect of water or atmospheric action long without crumbling, so the inventor had to begin anew.

HEATING BY SUNSHINE.—Prof. E. S. Morse, of the Essex Institute, has devised an ingenious arrangement for utilizing the heat in the sun's rays in warming our houses. His invention consists of a surface of blackened slate under glass fixed to the sunny side or sides of a house, with vents in the walls so arranged that the cold air of a room is let out at the bottom of the slate, and forced in again at the top by the ascending heated column between the slate and the glass. The out door air can be admitted also, if desired.

SCIENCE AND INVENTION.

NEW WOOD PRESERVING PROCESS.—A new wood preserving process has been invented in France by M. Jacques. He first impregnates the timber thoroughly with a simple solution of soap, mixed with an acid—preferably phenic acid. This causes the fermentation in a few days' within the wood, of a fatty acid, which is insoluble in water, and impregnates the remotest fibers.

WOOD POLISHING MACHINE.—A wood polishing machine has just been brought out by Almon Bridgman and James L. Perry, of Berlin, Wis., wherein the combination is shown of a sand-paper cylinder, with a presser-roll suspended above it in adjustable bearings, and yielding feed-rolls which are adapted to carry the stuff away from the cylinder and against the presser-roll.

NEW NUTLOCK.—A nutlock has been patented by Anson R. Bloomer Yorkville, O., in which fish-plates, connecting adjoining rails, are fastened by slotted bolts which are adapted to receive a wedge-shaped locking key, one part of which fits into the slot of the bolt, and the other part formed in an S-shaped spring-arm embraces one side of the bolt and bears against yielding washers.

COAL HOD.—A new coal hod has been invented. It has a primary bottom, and then a filling composed of paper and sheet-metal scraps over which there is a lining forming a secondary bottom. There are some other peculiarities of construction in its finish rendering it easy to be handled. It is patented by William M. Boyd, of Mt. Lebanon, Pa.

INVENTION FOR HARVESTING IN WET WEATHER.—Mr. R. Neilson, of Halewood, near Liverpool, has devised and placed at the free use of of his brother farmers a method of harvesting in the stack which may be applied to grass, grain, and almost all kinds of field produce, and to which, if the statements made about it are trustworthy, renders the farmer largely independent of the weather at harvesting time. As applied to hay the process is simply thus: The stack is made in such a way as to leave a hollow space in the middle, running up about a third of its height, and the lower end of this hollow is connected with the outer air by a tube. The end of this tube is connected with an exhaust fan, and as soon as the stack begins to heat the fan is set to work, and the moisture is drawn forth in a cloud of steam. The fan exhausts the tube, the outer air presses through the stack in all directions to supply it, and the hay is cooled and dried. The stack can thus be kept at any temperature by watching the thermometer; and a little careful attention has been found to make the condition of the hay thus perfect, even in cases in which it had been stacked quite wet. The method is easy to carry out, and is said to save in labor in the hayfield what it costs in simple machinery.

AN IMPROVED STEAM HAMMER.—A steam hammer or press has lately been invented, the rapid operation of which enables certain descriptions of tools or implements to be produced at much less cost than heretofore. The weight of the machine is some thirteen tons, and, in its operation, dies are used according to the shape of the tool desired. In these dies a piece of iron the proper weight is put, and by intense pressure the metal is fashioned to the desired shape. By an ingenious arrangement the iron is "steeled"—that is, the required portion of steel is welded to it by pressure from four directions—when it is again placed in the die, repressed, and the "eye" punched; it is then taken to be pointed, and dressed ready for market. The capacity of the machine is rated at twenty-four dozen hatchets per week; a workman, by the ordinary method, could not turn out more than ten dozen in the same length of time. It is also applied to the cutting of iron, its rapid and effective action insuring a considerable saving of time and labor. In this latter operation a heavy knife is put upon the machine, and it will make a clean cut of two and one-quarter by one and a half inches through cold iron.

NEW SEAMLESS TUBING—A Valuable recent inventions connected with the manufacture of iron tubes and columns is that described in the United Sates letters patent granted some days since to Albert L. Murphy, of Norristown, Pa. The invention relates to the manufacture of seamless tubing, shafting, columns and kindred hollow articles, and it consists in making the tube directly from the unrefined puddled iron known as "muck iron" by arranging and securing pieces of unrefined iron around a central core of refined iron, and then rolling or reducing the pile so formed over an internal mandrel or ball into a tube or column by suitable mechanism. By this process a merchantable refined iron tube column or like article of superior strength, quality and cheapness can be made almost wholly from unrefined puddled or muck iron, thereby saving the cost of and dispensing wholly with the heretofore essential intermediate steps of finishing or converting into sheets or skelps prior to its manufacture into tubing.

Instructions for the Care of Steam Engines,

Never allow an engine to become dirty, as thorough cleaning requires no great amount of labor. An engine which has always been kept clean, protected from rust and not abused in any way, is worth when second-hand very much more than another which has had little attention, being allowed to rust, and to take care of itself generally. A handsomely kept engine, with all its parts clean and in good order, furnishes stronger evidences of an engineer's capabilities than a volume of written recommendations.

Never depend entirely on patent oil cups, as they either feed too fast or not at all. There is generally too much oil wasted on engines. What is needed is a small quantity at the right time and in the right place, and all that is not essential is wasted.

Do not allow the packing to become hard and dry in the stuffing boxes, as under such circumstances it has a tendency to cut and flute the rods.

Never strike any part of an engine with the face of a hammer or head of a monkey wrench, as, in consequence of their being headed with steel, they have a tendency to bruise the parts and disfigure the engine.

Never set steam packing, cotton waste, tops of oil cups, or anything that is to be used around the cylinder, valve, piston-rod or bearings of steam engines, on the floor, as they will invariably pick up sand or grit, which injures the rubbing and revolving surfaces with which it comes in contact.

When practicable, piston and valve packing should be applied when the stuffing boxes and rods are cold. The best packing is often destroyed through ignorance or want of skill,

Almost any packing may be improved by being soaked in beeswax, tallow and black lead before being used.

Gum joints that require to be frequently taken apart should be coated with chalk before being placed between the flanges. This prevents the gum from adhering to the metal and being destroyed when the joint is taken apart. All gum joints located in the water space of steam boilers should be coated with lead and tallow before being put together. This has the effect of preventing the sulphur of the gum from attacking the metal and destroying the surfaces.

When it becomes necessary to stop an engine with a heavy fire in the furnace, place a layer of fresh coal on the fire, shut the damper, and start the injector or pump for the purpose of keeping up the circulation in the boiler.

Always see that the cylinder drain cocks are open when the engine is standing still, and never close them till after starting.

Never admit the tallow to the cylinder until the engine is fairly under way and the cylinder drain cocks closed.

Always start an engine slowly, and allow it to come up to speed gradually.

Before starting an engine always warm up the cylinder by admitting the steam to both ends. If a marine engine, see that everything is clear of the engines and propeller, and that the cocks and valves are all right. Whenever an engine is stopped for any length of time, examine all its parts for the purpose of seeing if they are in good order.

In cases of extreme heating, slack up on the keys and gibs, permit them to run loose for a time, and then take up the lost motion gradually.

Examine the piston packing in the cylinder frequently, for the purpose of seeing that it is tight and in good order.

Keep the cylinder and steam pipes well covered with some good non-conductor, to counteract the cooling effect of the atmosphere.

Whenever a clicking noise is heard in the cylinder, open the cylinder drain cocks and allow the water to escape. Then let them remain open until the cylinder works dry steam.

Keep your steam always at the same pressure, as, although all engines employed for manufacturing purposes have governors, they are not always reliable or capable of meeting the requirements of varying steam pressures and varying loads. Consequently, if the steam is, through neglect, permitted to rise above the working pressure, the engine will increase its speed, which will induce a loss of speed, as every revolution above the speed at which the machinery is geared for the manufacture of the different materials is a waste: and every revolution the engine falls below the regular speed is a loss of production.

WATER ELM.—An important use for water elm has presented itself in the making of sewing machine tables, the American Sewing Machine Company using 30,000 feet per month in this way. The elm is laid one layer on another to the required thickness and then veneered with walnut. The process does not diminish the expense, but is rendered feasible by the scarcity of Illinois and Indiana walnut, which is hard to obtain, while that from Missouri and other Southern States warps so badly that its use has been abandoned. Water elm has in the past been a much despised wood, being thought almost worthless, except for use in making baskets or in some other trivial way, and not worth the cutting, but it appears to have a value, after all.

THE TECHNICAL DRAUGHTSMAN.—In engineering and contractors' establishments the technical draughtsman is frequently at the bottom of the welfare of the establishment, although often not recognized as such. Every one who has much experience in a workshop knows very well that often wood and iron are wasted, (to say nothing of the time) in marking out work from the absence of the knowledge of practical geometry amongst the workmen. Some commonplace workman gets hold of a drawing and proceeds to mark out some piece of work; he neglects his center lines, works on no definite principle, and when half finished, he discovers that the work won't come in—in fact, what has been done is completely wasted. A workshop where the master has worked his way up without a knowledge of scientific principles, is frequently the place where the above kind of thing most frequently occurs. He keeps no draughtsman, but does his sketching with a lump of chalk, or the toe of his boot, not knowing that it is false economy to economize in the drawing office, or in fact in any technical pepartment. We have heard it pithily observed that it is better and cheaper to waste paper than wood or iron.—*Wood and Iron.*

HORSE POWER SUPERIOR TO STEAM.—After a long trial the experiment of propelling street cars by steam power has been indefinitely abandoned in Paris. On theoretical grounds it was supposed that a considerable economy would result to the proprietors of the railway from the substitution of a simple mechanical motor for the traction of horses, but this anticipation has not been fulfilled. On the short lines, particularly those with sharp curves and steep grades, the superiority of horse-power was soon shown; but on the long, straight routes, particularly those which were apt to be overburdened at certain hours on certain days, the reliability of steam gave it an apparent advantage, and it is only after three years' trial that a comprehensive summing-up has proved that this advantage is gained at an increased expense. The cost of fuel is indeed much less than that of maintaining horses enough to develop the same amount of power; but to this it was found necessary to add a certain extra expense of attendance, a rather heavy total of items of repairs, and last, but not least, a constant drain of money paid as compensation for losses caused by accidents, either to passengers unfamiliar with the operation of the cars, or to other persons, particularly those whose horses, as often happened, were frightened by their steam and smoke. Time did not seem to diminish the frequency of these occurrences, and the influence of police authorities seconded that of self-interest to secure the withdrawal of the motors, at last successfully.

RAILROADS.

The Cleveland, Akron & Columbus earnings the fourth week in June were $14,224, those for the same week last year being $11,659.

The C. A. & C. Railroad is now purchasing new tools and machinery for the Mt. Vernon shops. One thousand tons of steel rails, supplied by the Cleveland Rolling Mill are being put down near Millersburg and Orrville.

The Missouri Pacific system, already almost the largest in the world, has been considerably increased within a few weeks by the opening of the following additional lines: Omaha line, Atchison to Union Pacific Junction, 145 miles; Lexington and Southern division, Carthage to Joplis, 17 and 2-10 miles; St. Louis, Iron Mountain & Southern, Knebel to Harrisburg, 58.1 miles; Missouri, Kansas and Texas line, Temple Junction to Taylor, 38.8 miles. This, in addition to 259.2 miles, making the aggregate mileage of the railways leased and operated by the Missouri Pacific Company, with Mr. Jay Gould as President, no less than 6,248 miles with more to follow.

We have received a new and revised edition of the elegant manual of the Pittsburg & Lake Erie Railroad Summer Excursion, Routes, Season of 1882. It has the three great merits of fullness, explicitness and clearness. Under each route are the lines traversed, with the name of the city at which a change of land or water line is made. The routes thus defined number no less than 910, and constitute a marvel of railway arrangement. A wide region of this continent is thus placed before excursionists "where to choose." Return tickets with special privileges are granted to October 31.

The Valley Railway has made a siding by the Cleveland Standard Oil Works for 90 cars, and henceforth all oil dispatched by the Lake Shore and other lines will pass over the Valley Railway tracks.

It is now a settled fact that the Cleveland, Connotton Valley & Straitsville Railroad will tap the Pan Handle at Coshocton instead of reaching Zanesville by the West Lafayette, Plainfield, & Otsego route, as before anticipated. Work on this road, which was so suddenly suspended last November, has just now been resumed in the vicinity of Avondale, and the contractors are now rapidly pushing the work to completion. Track laying, which began a few days ago, is now progressing so rapidly that it is expected to run trains into Coshocton by October 10. The road will drain some of the choicest mineral regions in Ohio.

The cost of Railroads in Ohio to June 30, 1881, is $343,091,394.64. The net earnings of the railroads of Ohio for the last year are $16,332,441.57, which is a trifle over 18 per cent. on the valuation.

The valuation for taxation of railroads in 1881 was $83,784,506.68; for 1882, $88,281,578, which will be observed to be a little over 25 per cent. of the cost as above shown.

Track of the Wheeling & Lake Erie has been laid five miles below Massillon, and is being pushed to Zoar, about 12 miles further, with great rapidity, where connection is made with the Cleveland & Marietta and Cuyahoga Valley lines.

Wooster has subscribed the $50,000 required to the Kilbuck Valley Railway.

PLANING MILLS.

A CORRESPONDENT in the BUILDER AND WOODWORKER writes as follows: "The length of life of a planing machine depends altogether on the care and usage it gets. Machines of all kinds are so near animals that good care tells as well on them as on, perhaps, the more intelligent machines. I sometimes say that a machine knows its master as well as a dog or horse does, and when you come down to a nicety about it, I think they do. I have been into a mill and seen three or four men around a machine trying to force a 2x12 plank through, and finally by driving and pulling, it got through. If you should visit that mill you would find the rolls a little lower than the bed, or one roll down and the other up, and the pressure bars jam down on the stuff so that it would be impossible to get the stuff through under any consideration almost. A mill constantly used like this will not be likly to live long. The lower rolls want to be kept for the ordinary run of work so that a piece of x x x tin can be slid under a straight edge on the bed piece, the straight edge resting fairly on the whole train of rolls. In heavy work that is badly warped or crooked, a little more will be necessary. (And here is where the easy and quick adjustment of the feed rolls comes in.) You have, perhaps, two or three thousand feet of hardwood which, if it laid a long time, is crooked and warped. Just raise the lower rolls a little and it relieves the machine a great deal. Bring the pressure bars down just to a bearing, and no more, and the work will go through without any trouble. Our Eastern oak is about as hard on machines as anything we have. I speak of two sided mills, for I hardly ever use a one-sided mill, except a one-side traveling bed mill, and on these no pressure bar troubles you unless you have one that planes both sides and matches. Constant care should be taken that the rolls are kept up level, and also a straight edge passing over the top of the bottom rolls should come just fair with the bars, taking the stuff over the bottom cylinder a very little higher if anything, but certainly so the stuff will not lift in passing over the bar. Here is where a great deal of trouble comes in, and, consequently, a great many broken mills. Pressure bars should be kept just tight enough to make a good firm bearing and no more, especially the bar over the lower cylinder. If you have tight pressure bars your mill will work hard, and you will have to keep very tight feed belts and do less work. Perhaps you may say I can't spend time to alter the rolls every time a little hard job comes along; to which I will say, perhaps, then, you can spend a great deal more time in the repairs of your mill. It is these little details that lengthen out the life of a mill. Very often a few minutes care and attention will save hours of time and breakage of machinery. So I say the length of the life of a mill depends on the care that is taken of it. It is the constant attention to details that keeps it in good condition. Don't be afraid to see to little things. Keep every nut and bolt screwed up tight."

EARLY HISTORY OF AMERICAN HARDWARE TRADE.

About the year 1827, or 1828, Mr. Amasa Goodyear, a manufacturer for many years of hay forks, buttons, and other articles at Salem village, near Waterbury, Conn., who had been accustomed to take orders by semi-annual visits to the city, storing his goods in the warehouse of Mr. David Prescott, opened in Church alley in connection with his son, the late Charles Goodyear, of India-rubber celebrity, and under the management of the latter, a small store, which, it is believed, was the first in the United States for the sale of American hardware. A. Goodyear & Son having failed, through speculations of the junior partner in real estate, the business, in January, 1831, passed into the possession of Messrs. Curtis & Hand. About the former date the business was also commenced in New York by Christopher Hubbard, afterward Casey & Hubbard, who were followed in 1829 by George H. Gray & Co., and Hasner & Green, of Boston. At that time there was but one hardware store in the country of one hundred feet in depth, those of forty to sixty feet deep being considered first-class stores, and a rent of $1,000 per annum rather a high one. The number of articles of domestic hardware, kept or to be obtained by the largest dealers was quite limited, and embraced many small articles of domestic hardware, as for instance shell and other buttons, which have since passed to other branches of the trade. Among the staple articles kept by the earliest dealers were Goodyear's patent molasses grates, Fenn's patent cockstop and leather faucets, cast bits and screws (not very saleable), nail, shoe, and side strap hammers (among which those of Charles Hammond, of Philadelphia, and Mr. Eastman, of Concord, New Hampshire, were well known), wooden awl handles, Rowland's mill saws, the circular and band saws, and wood-saw web, of Welch and Griffiths, of Boston (whose brand was already in repute), spinning-wheel heads of home invention, Brittannia wares, carpenters planes, manure and hay forks, shovels, scythes, etc. Even all of these had not come into use as early as 1828 or 1830, but the list of American articles purchased and sold by hardware dealers at the close of this year (1834), embraced the following goods furnished by Mr. Quincy from a record before him. Some of these articles were still more or less largely imported as well as made here. Iron and brass wire seives, board coffee mills, brass andirons, brass head shovel and tongs, cast iron circulars and gridirons, bung borers and reamers, iron wire, Brittania tea and coffee pots, wood faucets, wheel-heads, hoe (not planters'), scythes, cow-bells, japanned lamps, black-ball, bulls-eye and dark pan hand-bells, pewter faucet and molasses gates; lines, mackerel and small hemp, bed cords, clothes lines, window cord, coil rope of hemp and manilla; brushes, viz:, scrubbing, floor, paint, furniture, horse, shoe, hair, varnish, dust, sash, hearth, etc.; sand boxes, scale beams, sad-iron stands of zinc; sleigh-bells, rawhides, inkstands, gunter scales, board rules, gauging rods, pocket rules two and fourfold, Britannia tumblers and ladles; whipthongs, mouse traps, guns, bellows, coopers' axes, adzes and drawing knives, steelyards; cut tacks and brads, sheet nails, patent awls, iron candlesticks, mahogany knobs for drawers, steel squares, brass spring door catches, screw drivers, plated squares and bevils, brass nails, awl hafts, mincing knives, spring shoe punches, gimblets, coopers' braces, gut and bone whips, japanned door latches, circular saws, glass knobs, timber scribes, shingling, lath and axe hatchets, scratch awls, hooks and eyes, silver everpoint pencil, cases, razor straps, screw auger bits, pocket books, lead pencils, bone mold and suspender buttons, soap, axes, waffle irons, oil stones, blind fasts, mill, cross-cut and tenon saws, manure and hay forks, shovels, spades, glue, planes, sadirons, Bristol brick, cast iron cart and wagon boxes, brass head dogs, scythe-rifles, wood-saw frames.—Bishop's History of American Manufacturers.

Coal is mined from great depths; thus the Adelbert shaft, in Bohemia, is 9,280 feet from bank to sump, and the bottom is 1,548 feet below the level of the sea. At Gilly in Belgium, are two shafts, 2,847 feet. One at Lugan, Saxony, is 2,953 feet deep. At Rosebridge Colliery, near Wigan, England, the winding shaft is 2,458 feet deep, and the cage is hoisted in 55 seconds.

MINES AND MINING.

The Ontario Mining Company pay their eighty-first successive monthly dividend this day, of 50 cents a share, aggregating $75,000. Total of eighty-one dividends, $4,475,000.

Observations in shafts, mines and borings show that at a certain depth below the surface the temperature is constant all the year round. The exact law as to the increase of temperature beyond this depth is not known, it being assumed, however, that it rises from .03 to .133 C. for each additional meter (3.28 feet) of depth, and consequently increases by one degree for every 98 or 100 feet. Special circumstances, such as the influx of warm water, decomposition of gravel and feldspar, slow combustion of coal, etc., may naturally, involve changes in certain places. Thus, in the celebrated Comstock Mines, Nevada, a temperature of forty to fifty degrees C. prevails at a depth of from 2,000 to 2,500 feet.

The State of Ohio will in the near future become a mining State of no small magnitude. A few years since the State was considered to have no coal to amount to anything. At the present time there are in this State 457 mines in operation, employing 6,174 men, and yielding annually over 5,500,000 tons of coal.

Within the Iowa coal fields there are thirty-eight counties, of which twenty are producing coal to a greater or less extent. The mining industry of the State has become one of considerable magnitude, and also a great source of wealth. The coal seams are being developed as rapidly as railroad transportation can be obtained; a great many new mines are being opened, and yet the prospecting goes on, and every indication leads to the belief that the State will double her present number of mines, as well as her mining population, in a few years

The Marquette Mining Journal very truly says that some three years since the Menominee iron mining district of Lake Superior was little else than a wilderness, the Marquette region being for Bessemer ores the leading one. The young rival has, however, been steadily working to the front until now its ores rank among the finest of those in the market, and its product is enormous. For the first six months of the present year the shipments from the Menominee district have been 360,292 gross tons; its elder rival the Marquette still, however, retains its supremacy, having shipped in the same period 564,516 tons. In the former Chapin, Norway, and Commonwealth mines lead with each over 50,000 tons; in the latter, the Republic with over 80,000; Lake Superior, Champion and Cleveland with over 50,000. In the first six months of this year, the shipments from this grand region have exceeded those for a like period in 1881 by over 400,000 tons.

The existence of diamonds in their natural form within the borders of the United States has always been generally doubted, yet there are those who are firm in the belief that the same do exist within our domain. A recent report from Seneca City, S. C., is to the effect that some of the straw colored variety have been found there and that search is being instituted to secure additional specimens of these rare gems. In the country to the southwest of Colorado,

precious stones, such as rubies, garnets and emeralds have been found. We have it upon good authority that in Rio Arriba county, New Mexico, diamonds have been unearthed. The conformation of some portion of that county is very much akin to that of Brazil and South Africa, where the diamond fields are extensively and successfully worked. The finding of a single diamond is often a large fortune in itself, and should it be absolutely demonstrated that within the Rocky Mountain region there exist diamonds in their native state, an additional industry will be created which must eventuate in a lively trade

The origin of coal is due to the deposit of tropical plants and ferns—in fact, the virgin forest, acted upon by heat and pressure, compressed, calcined, carbonized, as was proved by the trunks of trees and the fossil plants found in coal and the superincumbent shale. It was to coal that England owed in a great measure her maritime supremacy, and Belgium her industrial power. In the middle ages coal was proscribed; and then as wood became dearer, coal was employed by degrees. The first railways were laid in England for the carsiage of coal; first, angle irons served as railways, then flat bars and ultimately the modern railway bars. The production of coal by the whole world was 300,000,000 tons, which at the rate of 8s. a ton, the average value at the pitt's mouth, represented about $540,000,000 or three times the value of all the silver in the universe. Of this quantity England produced one-half, and the United States upwards of $50,000,000 tons; then in the order of their output came Germany, France and Belgium. China would produce more coal than England as soon as all her rich deposits were properly worked. It was calculated that all the coal in the world would be exhausted in 800 to 1000 years, but before that time, the sun's heat, which originally produced the coal, would probably, judging from the success attending M. Monchot's efforts in Algeria, be used direct as the motive power. Pure carbon was consumed without leaving any ash; but coal, though it left a little ash, was in reality far more valuable. It was the mainspring of all our hearths and furnaces; it was force, motion, life itself, Belgium--that industrious little country with its four or five million inhabitants—worked its collieries both with energy and economy; and her miners, like those of other countries, gave evidence of a courage and a devotion under danger which were quite heroic.

Our remarkable progress in railway construction during the past eighteen months has not been without influence upon the various mineral industries of the Western States, having done much to encourage the settlement of the mining districts and to promote their rapid development. Facilitated accessibility, combined with the naturally reduced cost of transportation of the products, have favored the opening of new mines as well as the display of greater activity in the prosecution of work in the old ones. Mining machinery of modern designs, and with all the latest improvements, is now met with in almost all districts, and such primitive methods of working as were formerly used on account of limited means and high cost of transportation, have been abandoned in the majority of cases. The rapid strides with which some of our Western States and territories have of late advanced in metallurgical pursuits will therefore be a matter of but little surprise, being only a natural consequence of the improvements above mentioned, combined with the steady advance in metallurgical science. Colorado appears to have made special progress in this direction, having risen from a comparatively humble position to the first rank as a producer of precious metals. In the relation of production to area, it holds the first rank for gold and silvor combined and for silver alone, and the third for gold alone. In the relation of production to population, however, it ranks only third for gold and silver together, second for silver alone, and sixth for gold alone. The total value of its product during the census year in gold and silver was, in round numbers, $19,250,000, and if we add to this the value of lead and copper in crude metal produced, we have a total value of metallic product of $22,750,000. Reports received from all sections of the State indicate that the coming season will be the liveliest in mining operations ever recorded in the history of Colorado, since in addition to the flourishing condition of Leadville and other mining districts, innumerable small camps are said to be springing up, many of which, it is expected, will yield a favorable record. California produces in value a little more gold than Colorado does of silver, and the deep mines, particularly in the Bodie district, have produced more gold than the auriferous gravel, which appears to be well-nigh exhausted. The Nevada mines, which produced great quantities of precious metals during the period from 1871 to 1879, show a notable falling off, due to a great extent to the diminution of the Comstock lode, and also to the lack of water required to work the gravel deposits. While the Utah mines give every indication of great richness and prosperity, the Arizona mines are of recent development, reliable accounts are not yet available. Considering the vast and practically unexplored mining regions of Alaska, New Mexico, Idaho, Montana, Dakota and Washington Territory, the ultimate exhaustion of the deposits now worked need occasion no anxiety.

A French engineer, M. Coquillion, states that he has invented a fire damp indicator by which ¼ per cent. of fire damp can be detected. It is simple, easily carried about and is easily understood. Professer Mounier, of Geneva, has also invented an instrument for indicating the quantity of fire damp in a mine. The instrument is taken into different parts of a mine, and five minutes are devoted to each station for the purpose of analysis, and four times an air pump is worked which sucks the air into a test tube. The instrument at each of the places is worked by clockwork, and at the commencement of the five minutes the connection with the outer air is closed by an electro magnet, which pinches an india rubber tube. A platinum wire is heated white hot by an electric current and burns the hydrogen, the carbonic acid being absorbed by the water. so that when the wire cools the air is contracted and sucks up mercury in a tube attached to the test tube. As the mercury rises it makes successive contacts with platinum wires passing into the tube at regular intervals, and the intervals correspond to the height to which the mercury would rise if the air had been contaminated with certain percentages of fire damp. Each time the current touches a wire it sends a current to the pit mouth and moves a kind of engine counter. After the further application of the heated platinum wire to complete the combustion, the number finally recorded at the pit mouth is the percentage of fire damp in that part of the pit indicated by the particular five minutes at which the indication is made. The electro-magnet being released opens connection between the test tube and the external air pump, and another instrument in another part of the pit takes up the work, and so on. It would almost appear that the instrument, although perhaps calculated for the purpose of detecting the quantity of gas in a mine, is aar too intricate for instruments for indicating the presence of gas in mines. Simplicity is an essential. It will be interesting to hear more of instruments having the same object in view, as it may then be possible to recommend an iustrument that will show where gas is or has accumulated, and thus give increased safety to those who have to spend a large portion of their lives underground.

REVIEWS.

The Practical Steam Engineers' Guide, in the design, construction and management of American Stationary, Portable and Steam Fire Engines, Steam Pumps, Boilers, Injectors, Governors, Indicators, Pistons and Rings, Safety Valves, and Steam Gauges. For the use of engineers, firemen and steam users. By EMERY EDWARDS, author of "A Catechism of Marine Steam Engines, of Modern American Marine engines, Boilers and Screw Propellers" illustrated by 119 engravings. 12mo. 420 pages. Cloth, $2.50. Philadelphia, Pa. Henry Carey Baird & Co., 810 Walnut street.

As indicated in the title, this work is especially for the use of engineers, firemen and steam users. The works of Mr. Emory Edwards, and which are standard works in their line, are sufficient to give assurance of the solid and useful character of the present volume. Availing himself of existing works of merit, Mr. Edwards has been enabled, with his knowledge of the best existing designs and constructions, to exclude whatever has been discarded and improved upon. There are few mechanical writers who have successfully entered on the exposition of mechanical principles with reference to their application and the elucidation of the details and methods of construction, but Mr. Edwards is unquestionably one of these. This guide will enable the mechanic to proceed understandingly with his work, whilst it affords the means of intelligent supervision of machinery. Singularly enough, the author mentions the very works now within a hand's reach from us, which those having charge of steam engines and boilers and wishing to improve themselves, have in the absence of such a work as the present one been driven to for aid, only to be repelled on the threshold by the algebraical formulæ with which they abound. The works in question are "Thermal Equivalents," "Laws of Thermodynamics," "Isothermel and Adiabatic Curves," very useful to those who can apply them, but which to these men, as the author remarks, are as meaningless and useless as so much Greek and Latin. There is no knowledge that cannot be conveyed simply if one has but got the capacity, and this Mr. Edwards possesses in an eminent degree. He has used throughout the simplest and plainest language so that his explanations can be readily understood. The history of the non-condensing steam engine is summarised and there follow descriptions and illustrations of the most popular make of steam engines. In this country stationary engineers are a shifting race and in changing from one situation to another they are brought in contact with engines of different makes, and days or weeks, as the author observes, will elapse before they get the hang of the things; hence the value of this work, which points out essential differences in valves and valve gears. So with other branches of steam engineering, mill owners, superintendents and other "bosses" as well as engineers and firemen will find their account in studying it and having it constantly on hand for reference. The plates, which number 119, are excellent. A valuable introduction treats of the mechanical powers, and the nature of power; latent heat; latent heat of steam; specific heat; gain by expanding steam; centre of gravity of a body, centre of oscillation and centre of gyration. In the numerous chapters and sections all the parts of a steam engine are dealt with. The last chapter which extends over fifty pages, consists of practical notes on the management of steam engines and boilers. The exhaustive character of the work may be judged from the fact that the index alone consists of fourteen closely printed columns in small but clear type. The work should be in every machine shop and mill in the west.

Wide Awake for August, 1882. Boston; D. Lothrop & Co.

The August Wide Awake is notable for some very beautiful drawings of girls with flowers; the exquisite frontisplece, accompanying the exquisite poem of "How the Laurel went to Church," "Pasture Lillies—a sumptuous Sheaf," and "Canada Lillies on Stately Stems,"—engravings. "Wild Flower Papers" are continued. Among the good short stories is a true one of old frontier life, in which figures a famous Kentuky backwoodsman; another is the "Floral Procession," a story of Old Boston. Both these stories have full page engravings. A long installment is also given in the "The Trojan War," full of fun worthy of schoolboys deep in the classics. The comedy "No Questions Asked," moves on amusingly. "John Angelo Visits the Water Color Exhibition," is an engaging article with thirty one engravinge and fac simile sketches of prominent pictures. There is a sparkling operetta, "The Rebellion of the Daisies," with effective situations and costuming and its brilliant music and six capital illustrations. Altogether this is an admirable number.

Only a Crape on the Door.

The well known music publisher, Mr. F. W. Helmick, 180 Elm street Cincinnati, O., has issued a new song with chorus under the above title, which is pathetic in the highest degree, and which as a natural and most effective expression of grief will be welcomed in thousands of homes which death has entered, as well as those of sympathizing friends, as affording an outlet for the expression of the tenderest feelings of humanity. The music, suitable for the piano or organ, accords with the composition, the author of which is Mr. Edward J. Abraham.

Dronier claims to have discovered a simple method of rendering bronze as malleable as copper, iron, etc. This consists in the addition of a very little mercury—one and a half and two per cent. It seems to act mechanically rather than chemically.

Cleveland Wholesale Prices.

HARDWARE.

Adzes.

Carpenter's ..... per doz $18 40
Ship ..... " " 18 75
Heavy railroad .... " " 19 50

Axes.

Hunt's ..... ℔ doz $ 9 50
Lippincott's Crown ℔ doz 9 00
Cut More ℔ doz 9 00
Peck's Double Bit ℔ doz 22 00
" Champion Blade ℔ doz 11 00

Anvils.

Eagle, Amer... per lb. 10c dis 20
Wright's ..... 10¾c@11c
Armitage's Mouse Hole 9¾@9¾c
Trenton 10¾c
Wilkinson's 10¾c

Anvil Vise and Drill.

Millers Falls Co. $28 ..... dis 20
Cheney Anvil and Vise dis 25&2

Vises.

Solid Box, list of July 1, '79, dis 35
Solid "Crown" (A. H. Hildick) ..... 40 to 100 lb. 15c net
Solid, Peter Wright's 15¼
Solid, Wilkinson's 13¾
Parallel, Parker's ..... dis 40
Saw Filers, Hopkins' ℔ doz $17.50, dis 10
Reading ..... dis 45&10
Cowell Hand Vises ..... dis 20
Richardson's Vise and Anvil ..... dis 25

Augurs and Bits.

C S cut augers ..... dis 40&10
do do do bits ..... 40&10
D C gimlet do Ives .... dis 50
Snells bits ..... dis 40
Russell Jennings' augers dis 16⅔ &10&10
Cook's pat augur ..... 40&10

Animal Pokes.

Berea, per doz 4 00
Eagle, per doz 6 00

Apple Parers.

Domestic & Reading ℔ doz $7 50
Turn Table 9 00

Bolts.

Machine ..... dis 60
Bolt ends ..... dis 60
Plow ..... dis 50
Plow, R. B. & W ..... dis 40
Cast Iron Barrel Shutter, etc ..... dis 50&10
Cast Iron Chain (Sargent' list) ..... dis 60&10
Ives' Pat. Door Bolts .. dis 50
Wrought Barrel ..... dis 55&10
Wrought Square ..... dis 55&10
Wr'g't Shut'r, all iron, Stanley's list ..... dis 50&10
Tire, R. B. & W., new list ..... dis 70&10
Stove, American Screw Co.'s ..... dis 40
Bolt Ends ..... dis 60

Bellows.

Dis

Blacksmith's com new list, 45 ℔ ct
Moulder's new list, dis 25 ℔ cent
Hand, new list, 25 per cent

Butts.

Dis

Wrought brass ..... 65&10
Cast, loose joint ..... 10&10
Pin, japanned and silver tipped ..... 45&10
Wrought, fast joint narrow ..... 40&10
Wrought fast joint broad ..... 40&10
Wrought loose joint broad ..... 45&10
Wrought table and back flaps ..... 40&10
Loose joint, reversible . 45&10

Cleveland Stamped Elbows

Genuine Russia Iron

4 inch per doz 4 50
4½ do do 5 50
5 do do 7 50
5½ do do 8 50
6 do do 11 00
7 do do 11 00

Planished American Russia Iron

inch, per doz 4 00
4½ do do 5 00
5 do do 6 50
5½ do do 7 50
6 do do 8 50
do do 9 50

Charcoal Iron

4 inch, per doz 2 00
4½ do do 2 50
5 do do 3 50
5½ do do 4 00
6 do do 4 50
7 do do 5 50

25 per cent

Chisels.

Hot and cold cutting ..... ℔ lb 30
Railroad track 30
Machinists 30
Mallet head 50
Tape 50
Packing 50
Stone cutters 50

Crowbars.

Cast steel ..... ℔ lb 8¼
Iron, steel points 6¼c

Cutlery, Pocket and Table.

Meriden Cutlery Co., table .. net
Am. Miller Bros.' Cutlery Co ..... dis 25
Humason & Beckley, pocket 33⅓
Naugatuck Cutlery Co .. list net
Aaron Berkenshaw's pocket dis 25

Coopers' Tools.

Bradley's ..... dis 14@20
Barton's ..... dis 20

Chains.

Coil by cask,

3-16	¼	5-16	⅜	7-16	½
10½	9	8	7	6½	6¼

Drills and Drill Stocks.

Blacksmiths', each .. $2.50 dis 10
Blacksmiths', self-feeding, each 7.50 dis 20
Breast, P. S. & W .... dis 20&10

Drawing Knives.

Witherby's ..... dis 65@10
Nobles Mfgr. Co 15
Adjustable handle 30

Emery and Emery Paper.

Regular Numbers ..... ℔ lb 6c
Flour and F. F ..... ℔ lb 4c
B. & A. Emery Paper .. dis 30&5

Enameled and Tinned Ware.

Kettles ..... dis 50
Sauce Pans ..... dis 25
Tinned Sauce Pans ..... dis 50

Files.

Auburn ..35 to £. dis 35 pr cent
E. M. Boynton's, new list .. dis 25
J. & Riley Carr ..... 4.50 to £.
Johnson & Bro ..... dis 30
Butcher's ..... 4.50 to £.
Walter Spencer & Co.'s "Diamond" ..... 4.50 to £.
Fisher's ..... 4.75 to £.
Moss & Gamble ..... 4.50 to £.
H. Disston & Sons (new list) ..... dis 40 per cent
Heller Bros.' Horse Rasps dis 25
Nicholson ..... dis 40
New American ..... dis 40
Union File Co ..... dis 40

Grindstones.

Ohio ..... 1½@1⅝ ℔ lb
Nova Scotia ..... 1¼@1½ ℔ lb

Hammers.

Maydole's ..... dis 15
Cheney's ..... dis 25
Hartford Hammer Co ..... dis 20
Humason & Beckley ..... dis 50
Verree ..... dis 5
Magnetic Tack, Nos. 1, 2, 3, $1.25, $1.50 and $1.75, dis 25&10
Nelson Tool Works ... dis 40&10
Warner & Noble's ..... dis 5
Kip's ..... dis 15
Yerkes & Plumb ..... dis 15
Wilkinson's Smiths' 11¾c ℔ net

Hatchets.

Yerkes & Plumb:--Shingling, Nos. 1, 2, 3,
℔ doz $7 50, $8 00, $8 50, dis 25
Claw, Nos. 1, 2, 3,
℔ doz $8 25, $8 75, $9 25, dis 25
Lathing, Nos. 1, 2, 3,
℔ doz $7 50, $8 00, $8 50, dis 25

Nails.

10 to 60d	3 40
8 and 9d	25
6 and 7d	50
4 and 5d	75
3d	1 50
2d	2 75
3d fine	3 00
2d fine	3 75
⅝ inch	3 00
4d barrel	1 00
1¼ inch barrel nails	1 50
1⅜ do do do	1 75
1 do do do	2 50
⅞ do do do	3 00

Cut spikes, all sizes 25
Clinch nails, all sizes 1 75
Casing and box nails 75 cts advance
Finishing nails, $1 25 do
Tobacco nails, 50 cts do

Nuts and Washers

Nuts, square ..... 7c off list.
Nuts, hexagon ..... 6c. off list.
Washers ..... 6c off list.

Picks.

Railroad, 4 to 5 lbs ... doz $7 75
5 to 6 lbs ... 7 75
to 7 lbs ... 8 50
7 to 8 lbs ... 9 50
Railroad Tamping Pick 7 to 8 lbs .. doz 13 50
Mill Picks per lb 75c

Rivets.

Iron ..... dis 40
Tinned ..... dis 40
Copper ..... dis 33⅓

Squares.

Dis

Steel or iron, case lots 50
Try squares and T bevels 40

Spikes—WROUGHT

All lengths by ¼ inch 4½c
do do do 5-16 ..... 3½
do do do ⅜, 7-16 & ½ in 3¼

Shovels and Spades.

Ames' new list, July 1, 1881, ... dis 15
Old Colony ..... dis 15
Remington's (Lowman's Patent) ..... dis 30
Rowland's ..... dis 40 and 10
Griffiths ..... dis 40&10

Saw Sets.

Boynton s patent X Cut, per doz $12; Hand Saw, per doz $10. ..... dis 20
Stillman's Genuine, per doz $3 50 and $5 50 ..... dis 20
Stillman's Imitation, per doz $3 25 ..... dis 20&10
Common Lever, per doz $2 dis 30&10
Leach's No. 0 $8; No. 1 $15; dis 15
Hammer, Hotchkiss $5 50, dis 10
" Bemis & Call Co.'s new patent ..... dis 40&5
Bemis & Call Co.'s Lever and Spring Hammer .. dis 30&5
Bemis & Call Co.'s Plate .. dis 10
" " Cross-cut dis 12½
Aiken's Genuine ... $13, dis 50&10
" Imitation ..... $7, dis 50
Hart's Patent Lever ..... dis 20
Disston's Circular ..... dis 40

Sad Irons.

From 4 to 10 lbs .... per lb 8¾ net
Self-Heating ..... ℔ doz $9 net
" Tailors .. ℔ doz $18 net
Gleason's Shield and Toilet ..... dis 25
Mrs. Pott's Irons, double pointed ..... dis 35
Mrs. Pott's Irons, square back ..... dis 35
Enterprise Star Irons ..... dis 40
Combined Fluter and Sad Iron ..... ℔ doz $15, dis 15

Scales.

Hatch, Counter, No. 171 .. ℔ doz. $42, dis 37½&10
Union Platform ..... $6, dis 45
Fairbanks' ..... dis 20
Buffalo Scale Co ..... dis 20&5
Forsyth Scale Co ..... dis 25
Howe's ..... dis 20&10
Chatlilon's Eureka ..... dis 25
Family Universal ..... dis 50
Scale Beams ..... dis 33⅓&10

Bag Holders.

Sprengle's Pat, $18.00 per doz 40 per cent. dis.

Planes.

Ohio Tool Co ..... dis 25
Sciota ..... dis 30
Bailey's Pat. Adjstble .. dis 20@25

Rules.

Stanley ..... dis 66⅔ and 10

Sash Locks. Discount.

Payson Mnfg. Co. "Perfect" .. 42
Simmons' Sash Supporters 20

Hinges.

Champion double acting spring hinges ..... dis. 30
Screw & Strap 8@12 in. .... $6. net
Gravity Locking Blind Hinges, Sargeant & Co. 70&10

Screws. Dis

Flat head iron or steel per cent dis. 30
Flat head brass 30
Round head iron or steel .. 25
Round head brass 20
Brass and Silver capped .. 40
Japanned, list of Plain Screws 30
Coach, patent Gimlet point, list per 100 60
Lag, taper points 60
Bed 10
Machine, flat head, iron .. 55
round head, iron 50
Bench, iron ..... 55&10
wood, beech, per doz $3 10
wood, hickory .... 20&10

Valves. Dis.

Jenkins' Patent Gate Valves .. 35
" " Globe .. 40
" Standard Packing " .. 20

Wrenches.

Coe's genuine ..... 40 & 10
Coe's imitation wrought bar .. 60
Mechanics' ..... 60 and 10

Wire.

Brass and Copper ..... dis 20
Bright & annealed, Nos. 0 @ 18 dis 50@52½,
" " Nos. 19 @ 26 dis 60
" " Nos. 27 @ 36 dis 65
Coppered .... Nos. 0 @ 18, dis 45
Galvanized, Nos. 0 @ 18, market list, ... dis 40@42½
Tinned, Nos. 0 @ 18, ... dis 40@45
Cast steel ..... dis 40
Tinned Broom Wire, Nos. 18 @ 25 ..... dis 55
Annealed Fence, Nos. 8 and 9 ..... dis 55@52½
Annealed Grape, Nos. 10 to 14 ..... dis 52½
Galvanized Telegraph, Nos. 7 to 9 ..... ℔ lb 7¼c
Galvanized Telegraph, Nos. 10 to 11 ..... ℔ lb 8¼c
Galvanized Telegraph, No. 12 ..... ℔ lb 10¾c
Fence staples .... ℔ lb 5½@5¾c
Fence Staples, galvanized, ℔ lb 7@7¼c
Stubs Steel Wire .. $7 00 to £
Barb Wire, painted 8¼c
Barb Wire, galvanized 9¼c
Crucible Steel Ropes from ¾ in. at 9c to 1¼ in. at 52c
Best Selected Iron Ropes from 3-16 in. at 3c. to 1¼ in. at 33c

Boiler Plates.

("Gaylord"--Standard Quality.)

C. No. 1	1 50
C. H. No. 1 Sheil	4 75
C. H. No. 1, 50,000	5 25
C. H. No. 1, 55,000	5 75
C. H. No. 1 Flange	6 50
Firebox	
T. S., 60,000 (as per)	6 50
T. S., 65,000 (act of)	
Homo. Steel, 70,000 (of Cong)	7 50
Heads, ¼c ℔ lb. extra.	

N.B.—Eastern brands of boiler plate at from 2-10 to 3-10c ℔ lb less than above prices.

Sheet and Tank Rivets. "Norway."

All sizes ..... dis. 15

Boiler Rivets—" Albany."

⅛, ¾, 11-16, and ¼ in. diam .5 50

Boiler Makers' Tools.

Doty's Power Shears .... net list
" Hand Lever Shears .. net list
" Power Punch ..... net list
" Hand Punch ..... net list
Steel Screw Punch ..... net list
Iron Screw Punch ..... net list
Boiler Plate Rolls ..... net list
Buffalo Forges & Blowers dis 20
Watson's " " net list
Spring Tube Expander .... dis 15
Roller Tube Expander .. net list
National Tube Cleaner .... dis 20
Wire Flue Brushes ..... net list
Anvils—"PeterWright" 12½ ℔ lb
Solid Box Vises ..... net list

Nuts, Bolts, etc.

Square & Hex. Nuts .... 7 off list
Washers ..... 6 off list
Machine Bolts ..... dis 60
Bolt Ends ..... dis 60
Boiler Patch Bolts ..... net list

Boiler Tubes.

"National" Standard Gauge 1 inch to 10 inch ..... dis 37½
"National" Standard Gauge 11 inch to 15 inch ..... dis 25
"National" Special Locomotive Tubes ..... net list

IRON AND STEEL.

Flat Bar.

1¼ to 4 by ¼ to 1 inch 2 85
4¼ to 6 by ¼ to 1 inch 3 00
1¾ to 6 by 1¼ to 1½ inch 3 25
1¼ & 1½ by ¾ to ¼ 3 00
1 & 1¼ by ¾ to ¼ 3 10
⅝ ¾ and ⅞ by ¾ to ¼ 3 25

Round.

1 to 1⅞ inch 2 85
2 to 2⅜ 3 15
2¾ to 3¼ 3 45
3¾ to 4 ..... 3 50
4¼ to 4½ 3 45
4¾ to 5 ..... 4 90

Square.

1 to 1⅞ inch 2 85
2 to 2⅜ 3 10
2¾ to 3¼ 3 45
3¾ to 4 ..... 4 00
¾ to ⅞ 3 00

Heavy Band.

1¼ to 6 by ¼ and 5-16 inch . 3 10
1 to 1¾ by ¼ and 5-16 do 3 15
⅝ to ¾ by ¼ and 5-16 do 3 50
⅝ to ⅞ by ¼ and 5-16 do 3 10

Half Oval and Half Round.

Wagon box iron ¾ and ⅞ .. 4 80

1-10c per lb extra will be charged for cutting to specified lengths

Light Band.

1¼ to 6 by ¼ to 3-16 ..... 3 50

Hoops.

1¼ to 2 , Nos 16 to 18 .... 3 90
1¼ to 4 do 13 to 15 .... 3 60
1-10 extra for each gauge lighter

Sheet Iron.

No 22 to 24 ..... 5 60
No 25 to 26 ..... 5 85
No 27 ..... 6 10
No 28 ..... 6 60

English Steel.

Best cast ..... ℔ lb 15½c
Extra cast 16½c
Round machinery, cast 14c
Swaged, cast 18c
Best double shear 15½c
Blister, 1st quality 13c
Refined tool steel 16½c
Spring calking ..... 7¼@7½c
German steel, best 11c
2d quality 10c
3d quality 9c
Sheet cast steel, 1st quality 15½c
2d quality 14½c
3d quality 12½c

American Steel.

Best brands of refined cast steel, ¾ to 2 inches 12c
Crucible cast 7c
Open-hearth ditto 4½c
Hammer cast steel 9c
Spring cast steel 7½c
Bessemer and open-hearth spring 5c
Ditto plow 4½c
Steel boiler plate ..... 6½@7c
Bessemer machinery .. 5 @6c
Spring and calking ..... 7¼@7½c
Tire 5
Sleigh shoe 5

Bessemer Steel Tire.

¾ to 1 by 3-32 ..... 4½ ℔ lb
¾ to 1 by ⅛ to 5-32 ..... 4½ ℔ lb
¾ to 1 by 3-16 to ¼ ..... 4½ ℔ lb

Miscellaneous Cast Steel.

Auger and auger bit 1
Axle steel for wagons 7
Frog points and plates 8
Frog size bars 8½
Pick, hammered 10
Mattock, beveled 9
Table cutlery 7½
Trap spring steel 10
Pike and cant hook 9
Coal and granite 8½

TINNER'S STOCK.

Tin.

Banca, ... per lb. 28@29c
Straits ..... " 24@25c
English ..... " 24@25c
Bar ..... " 27c

Tin Plate,

IC 12x12 charcoal ..... $ 6 50
IC 14x20 do ..... 6 25@6 50
IX 14x20 do 8 25
DC 12½x17 do 6 00
DX 12½x17 do 8 00
DXX, 12½x17 do 10 00
DXXX, 12½x17 do. 12 00
IC, 20x28 do 14 50
IX, 20x28 do 15 50
IC, 14x20, Best Roof 6 00
IX, 14x20, do 8 00
IC, 20x28 do 13 00
IX, 20x28 do 14 50
IC, 10x14 Best Coke 5 75

Solder.

Half and Half, in bars 15¼
No. 1 do 14½
Spelter Solder 25

Pat Planished Sheet Iron.

{A} ..... per lb 10½c
{B} 9½c

Nos	10	15	21	25
	to 14	20	24 & 26	
Com	3-60	3-80	4-00	4-20
Char	5-60	5-60	6-00	6-20

Sheets over 28 in. wide ¼c extra

Zinc.

Sheet, cask ..... 7½@ 7¾
Sheet, open ..... 8@ 8¼

Tinners' Tools & Machines

Machines (P. S. & W.) list add 20
Tools (P. S. & W.) ..... add 6

Plumbers', Steam and Gas Fitters' Supplies.

Wrought Iron Pipe ..... dis 60.
Enameled Pipe ..... dis 65
Artesian Well Casing .... net list
Hydraulic Tubes ..... net list
Malleable Iron Fittings .. net list
Cast Iron Fittings ..... dis. 35
Globe Valves ..... dis. 35
Angle Valves ..... dis. 35
Check Valves ..... dis. 45
Safety Valves ..... dis. 35
Eddy Gate Valves ..... dis. 20
Steam Cocks ..... dis. 35
Service Cocks ..... dis. 35
Ball Gauge Cocks (net per dozen) $15
Compression Gauge Cocks dis. 35
Miss. Gauge Cocks ..... dis. 35
Register Gauge Cocks (net per dozen) $15
Cylinder Cocks ..... dis. 30
Air Cocks (net per dozen) .. $2 75
Oil Cups ..... dis. 30
Steam Gauges ..... dis. 40
Water Gauges ..... dis. 40
Scotch Glass Tubes ..... dis. 50
Steam Whistles ..... dis. 35
Iron Body Globe Valves .. dis. 35
Iron Body Safety Valves .. dis. 35
Iron Body Steam Cocks .. dis. 35
Pipe Tools ..... special
Globe, Angle and Check Valves (Star's regrinding) ..... dis. 25
Mack's Injectors ..... dis. 25

Babbitt Metal.

No. 1 ..... ℔ lb 16
" 2 ..... " 14
" 3 ..... " 10
" 4 ..... " 8

LEAD.

American, ℔ lb 5½c
Bar, ℔ lb 5½c dis 10 per ct
Pipe, ℔ lb 5½c dis 10 per ct
Sheet, ℔ lb. 8c dis 10 per ct
Tin-lined pipe ℔ lb 15c dis 10 per ct
Shot Drop 7c; Buck 7c
Chilled Shot 8c

COPPER.

Lake Ingot ..... 18¼@18¾c
Baltimore ..... 17¾@17¾c
Arizona 17½c

Sheathing Braziers Copper, Bolts, &c.

Brazier's Copper, ordinary sizes, 16 oz. per sq. foot, and over per lb 30c
Brazier's Copper, ordinary sizes, under 16 oz. and over 12 oz. per sq. foot, per lb. 32c
Brazier's Copper, 10 oz. and 12 oz. per sq. ft. per lb. 34c
Brazier's Copper lighter than 10 oz. per sq. ft. per lb. 36c
Circles less than 84 inches in diameter .... per lb. 33c
Circles 84 inches in diameter and over ..... per lb. 30c
Segment and Pattern sheets per lb. 33c
Locomotive Fire Box sheets per lb. 30c
Sheathing Copper, over 12 oz per sq. ft. .. per lb. 28c
Bolt Copper ..... per lb. 30c
Copper Bottoms per lb. 31@32c

No copper is Sheathing except 34 oz. to the sq. ft.

Tinning.

14x18 ..... per sheet 6c

All other size sheets, 2½c per square foot For tinning both sides, double the above amount.

SCRAP IRON AND OLD METAL

DEALER'S SELLING PRICES.

	Net Tons.
No. 1 wrought scrap	$24
Sheet and hoop "	10@11
Cast scrap, (No. 1 heavy)	19
Cast Scrap (Stove Plate)	12

OLD METALS.

Old copper per lb	15c
No. 1 H. Brass per lb	14
Heavy yellow Brass do	12
Light Brass per lb	12
Scrap Zinc per lb	6
Tea Lead per lb	4
Heavy Lead per lb	3

PIPE, WROUGHT.

Standard Wrought Iron Lap Welded Steam and Gas

Inside Diameter. Inches.	Plain, Price Per Foot.	Galvan. or Enameled Per Foot.	Outside Diameter Inches.	Weight Per Foot.
⅛ ..	08		.40	.24
¼ ..	08	$0 11	.54	.42
⅜ ..	09	12	.67	.56
½ ..	11	15	.84	.85
¾ ..	13½	19	1.05	1.13
1 ..	19	28	1.31	1.67
1¼ ..	27	40	1.66	2.26
1½ ..	33	47	1.90	2.69
2 ..	46	64	2.37	3.66
2½ ..	75	1 00	2.87	5.77
3 ..	95	1 30	3.50	7.55
3½ ..	1 25	1 70	4 00	9.05
4 ..	1 50	2 05	4.50	10.73
4½ ..	1 75	2 40	5.10	12.49
5 ..	2 25	3 00	5.56	14.56
6 ..	2 75	4 00	6.62	18.76
7 ..	3 75	....	7.62	23.00
8 ..	4 75	....	8.62	28.00
9 ..	6 50	....	9.68	34.40
10 ..	8 00	....	10.75	40.64
12 ..	12 00	....		54.65

Discount, 62½ per cent; galvanized, 62½ per cent.

BRASS.

Cash prices for Roll and Sheet Brass. For less quantity than 100 lbs. add 3c per lb.

High Brass.

All Nos. not thinner than No. 28, wider than 2 in. not wider than 14 inch 30c
All Nos. to No. 28, inclusive, and widths over 14 to 20 in. inclusive 35c
All Nos. to No 28, inclusive, and widths over 20 to 30 in. inclusive 38c
½c per lb. advance on each No. above Nos. 28 to 38, inclusive.
All Brass thinner than No. 8 is Platers' Brass at 58c
Sheets 24x48, and all sheets cut to particular sizes and lengths under 30 inches, in width wider than 2 inches .37c

Low Brass.

4c per lb. more than High Brass.
Gilding metal 8c per lb. more than High Brass.
Platers' or Gold Metal
In Bars 48c
Sawed 51c
Planed or Polished ... 54c

For Slitting.

Metal in width in. to ½ in. to No 28, inclusive, 1c per lb advance.
Metal, in width 2 in. to 1 in., thinner than No. 28, 2c per lb. advance.
Metal, in width ⅛ in. to ¼ in. thinner than No. 28, 5c per lb. advance.
Metal ½ in. in width and less, 10c per lb. advance.
Any of the above widths cut to particular lengths, add 7c per pound.

COAL,

WHOLESALE.

Wholesale f.o.b vessel at Cleveland:

Carbon Hill and Monday Creek	$2 65
Massillon	2 75@ 2 85
Brier Hill	3 25@3 75
Pittsburgh	3 00
Salineville	2 25
Tuscarawas	2 25

RETAIL.—Delivered.

Massillon Lump	$4 00
" Nut	3 75
Carbon Hill and Monday Creek, lump	3 75
Carbon Hill and Monday Creek, nut	3 50

75c less on cars by car load.

Anthracite Stove and Chestnut	7 15
Egg and grate	6 00

GLASS.

(Per box of 50 feet)

SINGLE THICKNESS

6x8 to 10x15	
11x14 to 15x24	8 50
16x24 to 20x28	9 75
15x34 to 24x30	10 75
26x28 to 24x36	11 50
26x36 to 26x44	13
26x46 to 30x50	14 00

DOUBLE THICKNESS

6x8 to 10x15	11 7
11x14 to 15x24	13 25
16x24 to 20x28	15 75
15x34 to 24x30	17 25
26x28 to 24x36	18 50
26x36 to 26x44	21 25
30x50	22 50
30x52 to 30x54	23 25
30x56 to 34x56	25 00
34x58 to 34x60	27 75
36x60 to 40x60	30 00

Dis 60 & 15 single, 60 & 20 double

OILS.

Pure Oils. packages included	
Sperm, winter bleached per gal	1 25
Whale, winter bleached per gal	63
Straits	50@58
"A" oil for tanner's use	35 @40
Lard oil extra W S	1 05@1 10
do No 1 do	82@87
do No 2 do	72@77
Tallow oil	75
Neatsfoot oil pure	90@95
do No 1	80@85
Linseed oil, raw	55
do do boiled	58
Cotton seed oil white ..	64 @ 66
do do yellow	60 @ 63
West Virginia lubricating 28 deg	12c@15c
Pure Mecca	55@ 50
Paraffine oil winter pressed	25@ 30
Machinery	40
Engine	50
Miners' oil	40@45
Drilling oil	40

Hides and Leather.

Prime cured hides,	7¼
Green hides	6@6½
Bull, scrubby, badly scored or damaged, cured, two-thirds price.	
Prime dry hides	13@14
Horse hides, green	$1 75@2 00
Horse hides, dry	$2 00@2 25
Prime cured veal calf,	12½
PrimeDeacon S, salted .	65@70
Pelts, wool on ..	32@34
Fresh slaughter sheep	30@$1 50
Fresh slaughter lambs	50@60
Green calf skins	13
Hemlock rough	23@24
Oak harness	34@38
Oak sole	37@40
Union harness	31@34

Cleveland Business Directory.

Assayers and Analytical Chemists.

JUDSON, W, E, Ana ytical Chemist, 8 Cushing Block.

Bolt and Nut Works.

HOTCHKISS & GAYLORD, manuf'rs. Machine, Plow & Elevator Bolts, Coach Screws.

Boiler Makers.

SMITH & TEACHOUT—(Established 1857.) Boiler, Tanks, Stills etc. 439 Broadway.

Bridge Builders.

BUCKEYE BRIDGE AND BOILER WORKS mfrs of Arch & Truss Bridges, Boiler Tanks and Oil Stills. Bet. Wasson St. and Case Ave.

Coal and Iron Exchange.

JACKSON IRON CO. Iron Ore and Pig Iron. Rooms 8 and 9. Fayette Brown, Gen. Agent.

RHODES & CO. Coal, Iron Ore an Pig Iron. Rooms 1 and 2.

Carriage Blacksmith.

STRIEBEL, CHAS. manfac'r. of Carriages and Wagons and platform trucks. Horse shoeing and general blacksmithing .93 Woodland ave.

Carriage Bolts.

THE COLWELL & COLLINS NORWAY BOLT CO., manufacturers of Philadelphia Carriage and Tire Bolts.

Church and School Furnture.

FAULHABER, GEO. manufacturer of School and Church Furniture. Fine Hard Wood work a specialty. 203 Ontario Street.

Custom Boots and Shoes.

ROONEY, JOHN manufacturer of hand-made Boots & Shoes, custom made and warranted 177 Ontario Street.

Carriage Repository.

GREENE'S, J. O., Carriage Repository, 408 Superior street and 52, 54 & 56 Rockwell street, dealer in Fine Carriages. Repair shop in connection.

SLATER, G. A., Carriage dealer, sells the best work for the lowest price. A fine assortment always on hand. Repository 365 Euclid Avenue.

Coal and Pig Iron.

ANDREWS, HITCHCOCK & CO., Briar Hill Coal and Pig Iron. 122 Water Street.

Electrical,

ELECTRIC SUPPLY CO. manfrs and dealers in Electric Burglar Alarms, Anunciators, Cell Bells and Batteries. Telephone lines built and repaired. 145 Seneca Street.

Fresco Artists.

KEMMER & KUSHMAN DECORATIVE CO., Fresco Artists, Fine Modern Wall Papers. 838 Euclid ave.

Foundries.

BOWLER & CO., Car Wheels, Patent Chilled Frogs, and all kinds of castings. 9 Winter.

CLEVELAND MALLEABLE IRON CO., manufacturers Malleable Iron Castins.

LAKE SHORE FOUNDRY, Water and Gas Pipe, Light and Heavy Castings. Alabama st.

TAYLOR & BOGGIS, successors to H. & H. F. Taylor, Iron Founders, 65 to 73 Central Way.

VIADUCT FOUNDRY COM'Y, Aenis, Carlin & Strangward manfrs of Machinery Castings Fine Light Castings a Specialty. Office & Works 11 13 15 and 17 Detroit Strert, near Center.

FITZSIMONS WM. & SON, Rolling Mill and Machinery castings. Rolls a Specialty. No. 435 Broadway.

File and Saw Works.

PARKIN, W. H. & CO., Hand-cut Files and Rasps, dealers in Disston's saws, 11 So. Water

Flue Cleaner.

CLEVELAND FLUE CLEANER M'F'G. CO. manufacturer of Aitchison & Doolittle's Patent Steam Flue Cleaner, 22 & 24 Power Block.

Hotels.

FOREST CITY HOUSE, cor. Public Square and Superior st., Terrill & Ingersoll, Props.

KENNARD HOUSE, D. McClasky, Prop.

NEW ENGLAND HOTEL, Water st., W. W. Wolcott, Prop. Refitted and refurnished.

STRIEBINGER HOUSE, between Ontario and Seneca sts. $2.00 per day. Hawley & Langton

CITY HOTEL, Seneca street. H. B. West, proprietor. $1.50 per day.

Hides, Pelts and Leather.

DENNISON BROS., dealers in Hides, Pelts, Furs and Tallow, 48 and 50 River street.

Hardwood Lumber.

MARTIN, J. T. dealer in Hardwood Lumber, Stone's Levee, near Central Way.

Lumber.

WOODS, PERRY & CO., manufacturers and dealers in Lumber, Lath, etc., 5 Carter st.

FISHER, WILSON & CO., wholesale lumber dealers (pine & hard wood), rough and dressed umber, timber, lath, shingles, etc. 47 Central Way

KRAUSE, C. A., & SON, wholesale and retail d alers in lumber. Yards cor. Superior and Wason and 281 Merwin streets.

Cleveland Business Directory.

Hardware and Iron.

BINGHAM, WM. & CO., Hardware, Iron, Nails and Metals, 148 and 150 Water street.

CLEVELAND ROLLING MILL CO., manuf'rs. of Steel and Iron Wire and Steel Tire.

WORTHINGTON, GEO. & CO., Hardware and Dealers in Metals. Water street.

Lime Manufacturers.

RUSSELL LIME CO., manufacturers of White Lime; also dealers in Plaster, Cement, etc. 85 Elm street.

Machinery and Boilers.

CLEVELAND STEAM FURNACE CO., Engines and Boilers, cor. Detroit and Center sts.

KRITCH, K. E. Metal Pattern Maker. Small machinery repaired. Lawn Mower sharpening a specialty. 42 South Water Street.

Machinery Depot.

CLEVELAND MACHINERY DEPOT, (now **National Machinery Depot.**) The largest stock of New and Second-hand Engines, Boilers and Machinists' Tools. Shop and Warehouse corner Bond and Superior streets.

Mercantile Agency.

THE MERCANTILE AGENCY. R. G. Dun & Co. proprietors. 121 Superior street.

Oil Manufacturers.

AMERICAN LUBRICATING OIL CO., manufacturers of lubricating oils. 23 Euclid ave.

Paints and Oils.

MASTERS, J. N. jobber in Paints, Oils, Varnishes. Brushes, 34 Prospect st.

Pattern and Model Makers.

WHITTINGHAM, J. & C., Metal Pattern and Model makers. 52 Canal Street.

REID, J. C., Pattern and Model Maker. 52 Canal Street., (Up Stairs.)

COTTRELL & CO., W. L., Pattern Makers, 53 Center street.

STAIR BUILDER.

PFEIL, CHAS, Stair Builder; Hard Wood Mantles and Office Railing. Works, 49 & 51 Canal street, Cleveland, Ohio.

JOHNSON & PURSER, Stair Builders, and manuf'rs of Mantels, Odd Pieces of Furniture, &c. 30 West street, up stairs.

Steel Stamps and Stencils.

FLEHARTY, J. H. & CO., Rubber Stamps, Seals, Stencils. 197 Superior street.

Tanners.

GAENSSLEN BROS., Tanners, and dealers in leather, oil and shoe findings. 80 Water-st.

Trunks and Valices.

FABER, J. manuf. Trunk, Traveling Bags and Ladies' Fine Satchels. Sample Trunks and Cases a Specialty. 56 Public Square.

Vessel Agents.

WEBB, H. J. & CO., Ship Brokers and Vessel agents. 17 & 18 Board of Trade Building. 122 Water Street.

Wood Carving.

HERKOMMER, J., Carver and Ornamenter in Composition. 225 Erie street.

Business Directory.

Akron, O.

AKRON IRON CO., manufacture best Common, Refined and Charcoal Iron.

CASCADE HOUSE, cor. Mill and Summit sts., near Depot. J. Downie, Prop.

MCNEIL, J. C., Steam Boilers, Heavy Sheet Iron Work. Repairing promptly executed.

PERKINS, C. E., dealer in Agricultural Implements, machinery, and Manufacturers' Ag'nt

TAPLIN, RICE & CO., manuf'rs. of Stoves and Hollow Ware, dealers in Tinners' Stock, etc.

WEBSTER, CAMP & LANE MACHINE CO., Founders and Machinists, 12 Main street.

AKRON POLISHING & PLATING WORKS.

Alliance, O.

ARLINGTON HOUSE, cor. Main and Liberty Streets. Centrally located. Sample Room for Commercial Travellers. H. S. Adams, proprietor

MCFARLAND, J. W. Engine and Machine Builder, and General Machine Jobbing.

Cuyahoga Falls, O.

THOMAS BROTHERS, manfrs of Ohio Stone Ware. Cuyahoga Falls Stone Ware Factory, cor. Main and Broad streets,

TURNER, VAUGHN & TAYLOR, manufacture engines, presses and grinding machinery for clay; also paper, chain, wire and flour mill machinery. Send for Circulars and price list.

SNYDER, H. wholesale manu acturer of Sash, Doors, Blinds, &c. Send for Price Lists.

THE CUYAHOGA FORGE AND IRON CO., manfrs. of every description Car, Truck and Driving Axles, Forging, Shafting, &c.

Canal Dover, O.

HECKMAN, E., manufr. and dealer in harness leather, upper, kipp and calf. Also, manufacturer & dealer in prime English Dairy cheese. Highest market cash price paid for hides.

Business Directory.

Columbus, O.

PAT. ADJUSTABLE WINDOW CURTAIN Cornice, manufactured by Strader's Curtain Cornice Works.

ROYCE & PULLING manufrs of Patent Steam Pumps for all purposes. Store room 30 High street. Works Nos. 5 and 7 Scioto street.

U. S. CARRIAGE CO. builders of fine Carriages, Buggies and Phætons. Salesrooms and Office 257, 259 and 261 Fourth street.

REYNOLDS BROS., manufacturers of hand-cut Files and Rasps. Old files re-cut. Send for Price List.

CITY BOILER WORKS, manfrs of Stationary, Portable and Locomotive Steam Boilers. All work warranted. Borger Bros. & Co.

MURRAY, HAYDEN & CO., manfrs of Malleable Iron. Cor. Randolph & West streets.

Canton, O.

DIEBOLD SAFE & LOCK CO., manuf'rs. Safes, Locks, Bank and Safe Deposit Works.

NOVELTY IRON WORKS, Mill work, Shafting, engines, Imperial job printing press, etc

NEW AMERICAN HOUSE, Canton. Fred. Hipp, Prop.

EBERSOLE & KAILEY, Machine and Jobbing Shops. Gearing for Patterns or Machinery a specialty. Models of all kinds made & repaired.

Geneva, O.

THE ENTERPRISE MACHINE CO., L. L. Crane, Pres't, manfrs of Machinists' Tools and Machinery. Gear Cutting a specialty.

Lima, O.

LIMA HOUSE, centrally located; telegraph office in the house. J. Goldsmith, Prop.

Massillon, O.

CITY CARRIAGE WORKS, P. H. Young, prop. manfact'r of Carriages, Phætons and Spring Wagons. Work warranted. Cor. Tremont & Erie.

Painesville, O.

NORTH AMERICAN CUTLERY CO., m'fr's of Steel Shears and Scissors—best quality.

Ravenna, O.

THOMPSON, T. F., dealer in Agricultural Implements, farm machinery, hardware, seeds, fertilizers, &c. Cor. Main and Prospect sts.

BALDWIN, D. L. & SON, Contractors & Builders and manfrs of all kinds of Moulding, flooring, siding, &c. Rip, Band and Scroll Sawing.

Steubenville, O.

DORRANCE, D.W., Tool Works, manufacturer of hand-made miners' and stone-cutters' Tools Promp attention given to mail orders.

Sandusky, O.

SANDUSKY WHEEL CO. manfrs. of Sarven Patent Wheels, Carriage Bodies and Seats, Plain Wood Hub Wheels, Banded Hub Wheels, Jacobs' Patent Neck Yokes.

Toledo, O.

BAKER, HERBERT, Machine Shop and Iron Foundry. 98 and 100 Erie street.

TOLEDO FOUNDRY AND MACHINE CO. builders of Steam Engines, Circular Saw Mills and all kinds machinery. Water St., cor. Cherry

RUSSELL IRON WORKS, mnfrs. of Architectural Iron Work, castings, pulleys, shafting and steam bending machinery. Cor. Water and Lagrange streets.

STANDARD SAW WORKS, H. Bartley, manufacturer and dealer in Saws of every description. All kinds of Springs made from Sheet Steel. Reaper, Hay Knives Truss Springs, &c. made to order. 92 St. Clair Street.

UNION Wooden Ware Manufacturing Co. manufacture Sewing machines, washboards, children's wagons, carts, wheelbarrows, sleds, kitchen wooden ware, &c.

HEPBURN BROTHERS, proprie. Union Boat Works. Boats of all kinds made to order. For sale or rent. Water Street foot of Cherry.

Youngstown, O.

BELL, EDWIN & SON, manuf. of Nail Kegs, Pat. coiled hoops, slack barrel and keg heading and oil barrel stock.

DINGLEDY, G. H. dealer in rough and dressed Lumber, Shingles and Lath.

MORTON HOUSE, formerly Maitland House, James Morton, Prop.

TOD HOUSE, cor. Diamond and Market streets. Henkel & Bowman, Props.

Zanesville, O.

KIRK HOUSE, William Kirk, proprietor. $1.50 per day.

Rochester, Pa,

OLIVE STOVE WORKS, (limited) manufacturers of Stoves and Hollow Ware.

Erie, Pa.

ERIE STEAM BENDING WORKS. H. G. Fink, prop'r, manufacturer of Bent Felloes, poles, snafts, bob runners, etc. Cor. 12th & Cherry.

GUNNISON, A. B., wholesale manufacturer of Wood Pumps. 233 East Twenty-Second St.

BALL ENGINE CO., limited, manufacturers of Automatic Engines of 15 to 80 horse power

NOBLE SEWING MACHINE CO. manfrs of the New Noble Sewing Machine. Send for circulars and prices.

A. B. FELGEMAKER & CO. Church Organ builders. Descriptive catalogue furnished on application.

Business Directory.

Titusville, Pa.

FOSTER & McKAY, dealers in boilers and engines, tubing, casing, old iron, rope, and all kinds of metals. Washington street, nr. Railroad.

Meadville, Pa.

CURRY & CO. general jobbers in Castings of al kinds.

Oil City, Pa.

REID, JOS. Machinist, steam engine and pump repairing. Brass and iron castings, light and heavy, made on short notice.

Sandy Lake, Pa.

EBERMANN, W. S. & SONS, manfrs. of the celebrated Ebermann Boiler Feeder. Send for Circulars and Price List.

Pittsburgh, Pa.

PRINTING PRESSES. W. A. Bunting, manufacturers' agent. Printers supplies, type, cards. 42½ Sixth Street. [Up stairs.]

BAIR & GAZZAM, practical machinists; gear cutting a specialty. Rice's Feed Water and Heater. 17 Wood street, corner First Avenue.

Wheeling, W. Va.

EXCELSIOR MACHINE WORKS, Redman & Co., general machinists and manufacturers of Marine and Stationary Engines, Hangers, Pullies, Shafting, &c. Cor. 18th & Chapline streets.

Louisville, Ky,

HAIGHT, ROBERT, Gold, Silver and Nickel Plating and Brass Finishing Shop. Car Trimmings and Steamboat work a specialty. 1 West Market street

Union City, Ind.

LAMBERT, J. W. & CO., mfrs of fork, rake, hoe and broom handles; spokes, hubs, whiffletrees, yokes, plow-rounds, &c. Correspondence solicited.

Olean, N. Y.

MYRICK BROS. & CO., manufact'rs Engines and Boilers, oil drilling tools, rig irons, etc.

Rochester, N. Y.

GOWE, JNO. N., mfrs. of Specialties, such as Machine forging, bridge bolts and trusses, railroad switches, spike, mall, chisels, &c.

ELEVATORS for Hotels, Factories and Private Houses. J. S. GRAHAM & CO.

KELLY, PETER, Boiler Maker, Mill street, cor. Furnace. Sheet iron work made to order

WOOD-WORKING MACHINERY. Send for Catalogue. J. S. GRAHAM & CO.

KINGSBURY, G. J., Cracker and Oven Machinery Works. Shawmut Building, Mill St.

WISEMAN, Albine, manufacturer of all kinds of Shoemakers' Tools. 117 North Water St.

ULSCHT & LINN mfrs of Wood Lathes, Engraving Machinery, &c 131 N. Water street

RAZOR STROPS. Sole mfrs. of all kinds of Razor Strops. Ulscht, Linn & Co. 131 N. Water

Buffalo, N. Y.

SANDS, PAUL, Marine and Stationary Steam Engine Works mfr. of drilling machines, foot and power lathes. 70 Columbia street.

EMPIRE STATE MF'G CO., O. F. Swift, prop'r, manfr of Fluters, Sad Irons, Spun Copper & Half Copper Tea Kettles. Washington, cor. Ohio

WHITE, L. & I. J. manfrs of Coopers' Tools, Carpenters Tools, Draw Shaves, Cleavers Choppers, Ship Tools, &c. 312 Exchange street.

THE BUFFALO NUT AND BOLT CO. [Limited.] Manufrs. of Hot Pressed Nuts, Bolts, Washers, Rivets, &c. No. 226 Ohio Street.

Rheims, N. Y.

GREAT WESTERN CHAMPAGNE. Finest made in America. Equal to best imported. Has taken highest awards everywhere, and is used all over the Continent. Try a case, and you will have no other. Pleasant Valley Wine Co., Rheims, N. Y.

Brattleboro', Vt,

A JOY FOREVER!

ESTEY ORGANS

Manufactured by

J. ESTEY & CO.,

Brattleboro', Vt.

(Catalogue free on application.)

H. C. CHANDLER
Engraver on Wood
Cor. Circle & Market Sts.
JOURNAL BUILDING INDIANAPOLIS, IND.

CLEVELAND
ELECTROTYPE
FOUNDRY
55 FRANKFORT STREET 55
CLEVELAND, O.

MARKETS.

Office of TRADE REVIEW AND WESTERN MACHINIST.

FRIDAY EVENING, July 28.

FINANCIAL.

There has been an active demand for loans and calls from the country for currency to meet the requirements in the interest of the immense movement of wheat. Discounts rule at 7@8 per cent. A large flow of currency will soon set in as the returns from the wheat will be early. A moderate amount of money has been loaned at 6 per cent on time, upon collaterals, and call loans have been negotiated at 5 per cent to a far extent. The supply of Eastern exchange is very large, and offerings are liberal between banks. There has been scarcely any mercantile demand and rates are unchanged

NEW YORK.—The market for call loans is easy and rules at 2½@3 per cent on pledge of ordinary stock collaterals and at 2 per cent on pledge of Government bonds. Time loans are quoted at 4@5 per cent; first class mercantile paper 5 per cent. The banks now hold in cash—specie and legal-tenders—$9,428,700 less than the sum held a year ago. The loans now are $19,077,800 less than then and the deposits are $30,795,600 less. An unusually early movement of the winter-wheat crop is expected, and for this movement the East must supply the funds, but it is a question whether or not we shall be called upon to pay what we owe before an export movement of merchandise sufficiently large to make the liquidation, shall have been made. Grain maintains its sharp decline. Stock speculators have been active. It is the railway stocks of the coal and not the grain carrying lines that have made the greatest advances.

IRON ORE.

There is nothing specially noticeable in the market for iron ore. The collapse of the strike in the Cleveland Rolling Mill has increased the feeling of confidence of dealers, and hopeful assurances are expressed of an improved trade with Fall. The lake shipments of iron ore up to and including July 12th, amounted to 1,161,148 tons as against 727,185 tons in 1881, an increase of 433,963 tons.

IRON.

For Pig Iron the demand is moderate and fair for the season and prices are well sustained. Stocks are unusually tight both at consumers' yards and at furnaces. Choice brands of iron of all grades are scarce and command full prices. We quote: Foundry No. 1 X, $25 @ $26; Foundry No 2 X, $23 @ $24; Gray Forge, $22. Considerable lots of Scotch Pig have changed hands, prices are firm and some have slightly advanced. We quote: Eglinton, $23 @ $23.50; Carnbroe and Glengarnock, $24.75 @ $25; Coltness, $27 @ $27.50; Gartsherrie, $25 50 @ $26, and Langloan, $25.75 @ $26.50. In steel rails there is little doing and iron rails are neglected. As to old rails the market is dull, and an urgent seller would be obliged to yield considerably in order to realise For old rails we quote T's, $26 @ $26 50, and D. H., $27,75 @ $28. American sheet is in very limitited supply and stocks are much reduced owing to the Pittsburgh mills continuing closed For manufactured iron there is a fair, steady demand, and prices are firmly sustained at our previous quotations. We hear of several large mills that are to be shut down through August. The market for plate and tank iron continues fairly active; no concessions are allowed to buyers even of large lots. Good sized orders for sheet iron have been taken. Prices for steel rails vary from $47.50 to $50.50; lots at second hand have been sold for less than manufacturers' demand.

CINCINNATI.—(Reported by Rogers, Brown & Co.) The market has shown considerable activity in foundry and forge grades of coke and and raw coal irons. Under a fairly large demand and extended enquiry prices of these qualities have been firm with a tendency toward advance. Charcoal Irons have only slightly sympathized, but reports from the car building interests indicate that there may be a change for the better before long. Quotations given below are for cash: Hot blast foundry—Hanging Rock CC. No 1; $26 50@$27.50; No 2, $25@$26 50; Southern, No. 1, $24@$26.50; Strong Coke, No. 1, $23.50@$24 50: No. 2, $22 50@$23.50; No. 3, $21.50@$22.50; Soft Stone coal, No. 1, $22@$23; No. 2, $21@$22. Forge—Strong, Neutral No. 1, Mill, $21@$22; Cold Short, No. 1 Mill, $20@$21. Car Wheel and Malleable—Hanging Rock Cold Blast, $32@$34; Hanging Rock Warm Blast, $26@$29; Southern Car Wheel Iron, $32@$36; Lake Superior do. $30@$33; Lake Superiar Malleable, $30@$33.

PITTSBURGH.—The pig iron market has undergone no quotable changes. Sales continue remarkably small, and will so continue till the unpleasantness is satisfactorily arranged between the workmen and employers. The sales were all foundry, there being no demand for other descriptions. Commission merchants say they have not experienced so dull a market for a long time, and no improvement is expected in the near future. No. 1 Foundry $24.50, 4 mos; No. 1, all ore, $25.50 cash; No. 2 Foundry, $25 cash. Cole and coke smelted from Lake Superior ore, 60 tons, foundry, $25, four months.

COPPER.

There is a steady limited business, strictly for consumption. Lake Ingot remains steadily at 18¼ @ 18⅜c, and Baltimore at 17¾ @ 17⅞c. England cables £68.

LEAD.

Pig sustains the recent improvement. There has been considerable more inquiry for hard and soft lead. Soft, on a limited jobbing scale, commands 4.85c. and hard lead 4.75 @ 4 80c. Foreign lead may possibly be laid down here within the range stated, and we hear of rumors that some has been offered for delivery a month hence.

TIN AND TIN PLATES.

The market for tin has been moderately active at 25⅛c @ 25½c, Straits Tin, and 25c Lamb and Flag, large lines. Advices from England and the East, per cable, have continued favorable, while, notwithstanding that at this season there is a check in the activity of tin plates, the demand is decidedly healthy. We quote: large lines, ordinary brands, per box, Charcoal Bright $5.87½ @ $6.25; ditto Ternes, $5.40 @ $5 50; Coke Tin, $5.25 @ $5.45, and dirto Ternes, $5.12½ @ $5.25. Prices in the Liverpool and London markets are strong.

SPELTER AND ZINC.

Heavy imports of spelter have demoralized the market. We understand that it is freely offered for 5.25c., and that bids of 5.50c. would receive future deliveries to the close of the year.—Sheet-Zinc is active at 7¼c.

COAL.

Trade is steady; and considerable shipments have been made. Prices are unchanged.

HARDWARE.

In the hardware trade both light and heavy, a reasonable fair business is being done. Carpenters and builders' tools find ready sale; also garden implements and household articles. The demand for nuts has improved, and stocks generally are badly broken. The Atlantic States Nail Manufacturing Association held their monthly meeting on the 20th inst. and confirmed existing prices. We continue to quote 10d. to 60d., $3.40 net, per keg, in large lots, and in small lots an advance on this price of 10 @ 15 cents. Penfield Block Company, Lockport, N. Y., have issued a revised catalogue and price list of their specialties. The Wm. Rogers Manufacturing Co., Hartford, Ct., have issued new prices and discounts for their flat and hollow-ware and plated goods Geo. D. Winchell Mfg Co., Cincinnati, have just issued a handsomely illutrated catalogue and price list of Coal Vases and Helmet Hods manufactured by them. In Coal Vases they show 12 patterns, assorted decorations, with and without detachable fire stands, and excellent patters of Helmet Top Coal Hods. A new corporation has been formed at San Francisco under the style of Hawley Bros' Hardware Co W. C. Bennett & Co., of the Detroit Machine Knife Works, have issued a new illustrated catalogue and price list of their moulding knives.

LUMBER.

A falling off has taken place in the demand for lumber for building purposes. Stocks are somewhat above those held last year. Sales so far will foot up higher than in the corresponding period of 1881; but the profits have been less. The general opinion is that prices will not go lower than at present and may stiffen later in the season. The season is now so far advanced that a break in values at primary points of supply cannot be counted on, and if lumber is to be bought for the fall trade it must go into pile at once. Large quantities of walnut were thinned out last season; but the knowledge that there is an abundant supply available prevents advance, and no improvement is anticipated in the average run of culls. The demand for whitewood for boxes is not as heavy as in former seasons. A fair amount of chestnut, which is used for finishing, has been purchased.

LUMBER.

PLANK. MIXED WIDTHS.
2 inch, 12, 14 and 16 feet, together.

A 1 and 2 uppers	$50
A 3	40
B	32
C	22
D	15
E	13

1¼ and 1½ inch.

A 1 and 2 uppers	$48
A 3	40
B select	32
C	21
D	15
E	13

BOARDS.
One Inch, mixed widths.

A 1 and 2 uppers	$44
A 3	36
B select	30
C	19
D	16
E	13

STOCK BOARDS.
12 Inches wide.

A 1 and 2 uppers	$45
A 3	38
B	32
C	21
D	16

STRIPS.
6 Inches wide.

A 1, 2, and 3	$42
B	32
C	22
D	16
E	13
Norway Fencing Strips	17
Norway Flooring Strips	25

WORKED LUMBER
FLOORING.

Flooring—A 3	$42
B	38
C	24
D	20
Norway Flooring—A 3	28
C	22
D	18
Matched Drop Siding, 6 inches—A 3	42
B	38
C	24
D	20
Beaded Ceiling $2 higher than Flooring.	
One half inch Bevel Siding—A 1 and 2	24
A 3	20
B	18
Ash Flooring—A 1 and 2	40

BILL STUFF.

Small, joists, 12, 14 and 16 feet	$15
Timber, larger than 8x8 special.	
Timber, longer than 18 feet, adds about $1 per foot per M. extra.	
Cedar Posts, large	30 00
" " medium	25 00
" " small	$15 to 20 00

SHINGLES, LATH AND MILL WORK

Shingles XXX	$4 50
Clear Butts	3 25
Lath	3 00

Surfacing, one side, adds $1.25; two sides $1.50
Matching, flooring and drop sidings, $2.50.

LAKE FREIGHTS.

COAL.

Buffalo to Chicago	$.62½@.65
Toledo to Chicago	1.00
Cleveland to Chicago	70@75
Erie to Chicago	70@75
Oswego to Chicago	1.50
Fairhaven to Chicago	1.30
Buffalo to Millwaukee	70@75
Cleveland to "	70@75
Erie to Milwaukee	75
Buffalo to Racine	80
Buffalo to Kenosha	85

IRON ORE.

Marquette to Lake Erie ports	1.25
Escanaba to Lake Erie ports	90@95
Escanaba to Chicago	90@95
Marquette to Chicago	1.15@1.20

TRAVELERS' REGISTER.

Lake Shore & Michigan Southern.

Trains marked with a * are the only trains that arrive and depart in this city on Sundays.

EAST BOUND TRAINS.

	Arrive.	Depart.
No. 20 Limited Express	*1:35 A.M	*1.50 A.M
No. 6 Atlantic Express	*7:05	*7 30
No. 10 Buffalo Accom	11:00	11.15
No. 8 C. & St. L. Exp.	*2:25 P.M	*2.55 P.M
No. 4 Special N. Y. Exp	10:10	10.35
No. 2 San. Div. Accom.	10:12	
No. 12 Conneaut Accom.		4.50
Nottigham Accommodation (Sundays only)	10.05 A.M / 4.45 P.M	9.00 A.M / 2.15 P.M
No. 18 Elyria Accom.	8.50 A.M	

WEST BOUND TRAINS.

	Arrive.	Depart.
No. 13 Mich. Accom.		6.40 A.M
No. 1 Special Chicago Ex.	*6 35 A.M	7.00
No. 3 Toledo Express	1.25 P.M	3.30 P.M
No. 21 St. Louis Express	*1.40	*2.05
No. 5 Pacific Express	*7.05	*7.35
No. 11 Conneaut Accom.	8.40 A.M	
No. 19 Pt. Clinton Accom.		5.00
No. 7 Michigan Exp.	*2.50 A.M	*3.05 A.M
No. 17 N. Y. & Chi. Ex	12.23 P.M	12.33 P.M

Cleveland, Columbus, Cincinnati & Indianapolis.

ARRIVALS.

No. 2 Col. & Cin. & Ind'pous Ex.	*7 10 A.M
No. 8 C. T.V. & W. & Clev Accom	10 30
No. 12 St. Louis & New York Exp.	*3 00 P.M
No. 4 Special Cin & New York Exp.	*3 40
No. 10 Wheeling & Cleveland Exp.	7 15
No 6 Indianapolis & Columbus Exp.	10 20

DEPARTURES.

No. 1 Cincinnati & Columbus Exp.	8 00 A.M
No. 11 Cleve, Indianap. & Wheel'g Ex.	7 10
No. 3 St. Louis & Cincinnati Ex	†2 00 P.M
No. 5 Night Express,	*7 25
No. 7 C.T.V & W. & Col. Accom	4 00

†This train runs daily to Indianapolis and St. Louis, and daily, except Sunday, to Cincinnati.

Cleveland, Tuscarawas Valley & Wheeling.

ARRIVALS.

No. 4 Wheeling & Cleve'd Exp	7 15 P.M
No. 2 Uhrichsville Accom	10 30 A.M

DEPARTURES.

No. 1 Wheeling & Cleve'd Exp	7 10 A.M
No. 3 Uhrichsville Accom	4 00 P.M

New York, Pennsylvania & Ohio.

ARRIVALS.

No. 7 Mahoning Valley Accommo	10 55 A.M
No. 3 New York Express,	*7 00 P.M
No. 1 New York Express,	6 50 A.M
No. 3 Pittsburgh Express,	*7 00 P.M
No 5 Pittsburgh Express,	2 00
New York Express	2 00
No 9 Youngstown and Pitts. Local	10 15

DEPARTURES.

No. 12 New York Express,	*7 10 A.M
No. 4 Youngstown Local,	11 00
No. 8 Mahoning Accommodation,	4 25 P.M
No. 2 New York Express,	10 45
No. 12 Pittsburgh Express,	*7 10 A.M
No. 6 Pittsburgh & Main Line Express	2 30 P.M

Cleveland & Pittsburgh.

	ARRIVE.	DEPART
Mail	1 45 P.M	8 50 A.M
Express	6 55	2 30 P.M
Alliance Accommodation	10 15 A.M	3 45
Ravenna Accommodation	8 35	5 35
Night Express	6 30 A.M	†11 40 P.M

† Night Express runs daily, except Saturday, by way of Wellsville, and on Saturday by way of Alliance.

Valley Railway.

ARRIVE.	DEPARTURES.
No. 2 Accom... 10 15 A.M	No. 1 Mail ... 8 15 A.M
No. 6 Express...1 35 P.M	No. 3 Accom. 2 20 P.M
No. 4 Mail .....6 30 P.M	No. 5 Exp.....6 05

Special trains leave on Sunday at 8.30 A. M. and 4.20 P. M., arriving at Cleveland at 10 A. M. and 6.25 P. M.

Trains leave from Depot foot of South Water Street.

Connotton Valley Railway.

Arrive.	Depart.
No. 1 .....10 05 A.M	No. 4.....4 05 P.M
No. 3.....7 15 P.M	No. 2.....0 15 A.M

All trains arrive and leave depot corner Commercial and Fifth Streets

Cleveland, Akron & Columbus Railroad,

Cleveland, Akron & Columbus Railroad, running over Cleveland & Pittsburgh Railroad to Hudson, for Akron, Columbus, etc.

	ARRIVE.	DEPART.
Mail	1 15 P.M	8 00 A.M
Express	7 25	1 50 P.M
Accommodation	10 10 A.M	3 45 P.M

	Mail.	Fast Line.	Accom.	Night Expr'ss.
Leave Cleveland	8 50 am	2 30 pm	3 45 pm	11 40 pm
Arrive Hudson	10 00	3 28	4 50	12 50 am
Ravenna	10 40	3 53	5 50	1 18
Alliance.	11 25	4 25	6 05 pm	2 05
N. Philadel	11 35 pm	7 15	.....	10 55
Salem	12 25	.....	.....	3 02
Canton	12 28	5 47	.....	3 20
Massillon via Alliance.	12 50	6 06	.....	3 38
Akron	10 42 am	4 10	5 40 pm	.....
Pittsburgh.	3 30 pm	7 45	.....	6 55
Wheeling	5 10	8 00	.....	8 55
Marietta	8 45	.....	.....	.....
Harrisburg.	.....	4 15 am	.....	4 00 pm
Philadelphia	.....	7 50	.....	7 35
New York	.....	11 15	.....	10 35
Baltimore	.....	7 55	.....	7 20
Washington	.....	9 17	.....	8 47
Boston.	.....	8 00 pm	.....	.....

Ravenna Accommodation leaves Cleveland at 5:30 p m, reaching Ravenna at 7:15 p m; Akron 7:23 p m.

Newburgh Accommodations leave Cleveland at 11:00 a m and 12:30 pm. Returning, leave Newburgh at 11:10 am and 1:30 pm.

Passengers for New York, Philadelphia, Baltimore, Washington, and all points east of Pittsburgh make but one change of cars, viz. at Union Depot, Pittsburgh, excepting those leaving on the Fast Line which has Pullman Sleepers from Cleveland to Philadelphia and New York.

The Fast Line leaving at 2:30 P. M. has elegant Pullman Palace Sleeping Cars through from Cleveland to New York without change. Pittsburgh Passengers who desire Parlor Car accommodations can secure seats in this car.

The Night Express has Pullman Sleeping Cars from Cleveland to Pittsburgh which can be occupied by passengers at Union Depot, Cleveland, any time after 9:00 P. M. At Pittsburgh passengers can take elegant through Parlor or Sleeping Cars for the East.

Sleeping and Parlor Car accommodations from Cleveland and Pittsburgh eastward can be secured at the Union Sleeping and Parlor Car Office Union Passenger Depot; of H. C. Marshall, Union Ticket Office, Weddell House; or of the Ticket Agent at the Euclid Avenue Station.

Through tickets can also be secured at the same points. Baggage checked through from the Union Depot or from Euclid Avenue Station,

By the 8:50 A. M. train a through car leaves daily for Akron, Gambier, Mt. Vernon, Columbus and immediate points, without change.

The 2:30 P. M. train has through car for Akron, Orrville, Columbus and immediate points, arriving in Columbus at 9:25 P. M.

By the 3:45 P. M. Accommodation train cars run through without change from Cleveland to Cuyahoga Falls, Akron and Millersburgh,

Night Express leaving Cleveland at 11:40 P. M., runs daily, and makes connection at Wellsville for Steubenville, Bridgeport, Wheeling, Bellaire and intermediate points. Every night in the week except Saturday the night express runs via Wellsville. On Saturday nights it runs via Alliance. All other trains run daily except Sunday.

Trains arrive at Cleveland.—Night Express at 6:30 P. M., having Pullman Sleeper from Pittsburgh; Ravenna Accommodation, 8:35 A. M., Alliance Accommodation, 10:15 A. M.; New York Wheeling & Washington Mail, with Pullman Sleeping Car from New York and Philadelphia, 1:45 P. M.; New York, Philadelphia & Wheeling Express, 6:55 P. M.

WM. A. BALDWIN, General Manager. **E. A. FORD,** Gen'l Pass. & Tkt. Agt. Pittsburgh, Pa.

C. L. KIMBALL, District Passenger Agent, corner Bank and St. Clair streets, Cleveland.

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VIA THE

NEW YORK, PENNSYLVANIA AND OHIO RAILROAD.

Formerly Atlantic & Great Western Railroad.]

For New York, Boston and the East. The shortest and quickest route to Pittsburgh, Washington, Baltimore and the Southeast

Until further notice trains will leave the new Central Depot, South Water Street and Viaduct, as follows:

7:10A.M. LIGHTNING EXPRESS, (daily,) sleeping and hotel coaches from Leavittsburg. 8:55 a.m. To New York, Albany and Boston without change. Parlor car, Cleveland to Salamanca. Arrives at Meadville 11:20 a.m., (dinner); Franklin, 12:33 p.m.; Oil City, 1:00 p.m.; Corry, 1:00 p.m.; Jamestown, (Lake Chatauqua) 1:57 p.m.; Buffalo, 6:15 p.m.; Rochester, 8:30 p.m.; Hornellsville, 6:40 p.m., (supper); Corning, 8:25 p.m.; Elmira, 8:57 p.m.; Binghampton, 10:58 p.m.; Albany, 6:00 a.m.; Boston, 2:45 p.m.; arriving at New York, 6:50 a.m.

10:45 P.M. NIGHT EXPRESS, (daily except Sunday), Sleeping Coach from Leavittsburg to New York without change. Arrives at Youngstown 1:45 a.m.; Meadville, 3:50 a.m.; Corry, 5:20 a.m.; Jamestown, 6:22 a.m.; Buffalo, 9:45 a.m.; Rochester, 1:10 p.m.; Hornellsville, 11:20 a.m.; Corning, 12:53 p.m.; Elmira, 1:21 p.m.; Binghampton, 2:50 p.m.; New York, 9:25 p.m.

2:30 P.M. PITTSBURGH EXPRESS,—daily, through without change. Parlor Car, Cleveland to Pittsburgh, arrives at Youngstown, 5:00 p.m.; Pittsburgh, 7:48 p.m.; Washington, 7:30 a.m.; Baltimore, 8:15 a.m.; via Sharon and Sharpsville to Meadville 7:40 p.m; Corry, 9:10 p.m.; Lakewood, 9:50 p.m.; Jamestown, 10:00 p.m.; Salamanca, 11:10 p.m.

4:25 P.M. MAHONING ACCOMMODATION, stopping at all way stations. Arrives at Youngstown, 7:25 p.m; Sharon, 8:30 p.m; Sharpsville 8:40 p.m; connects at Leavittsburg with train No. 20 for Meadville and intermediate points, arrives at Meadville, 11:05 p.m. Pittsburgh, 10:48 p.m.

7:10 A.M. PITTSBURGH EXPRESS,—(daily) through without change. Arrives at Youngstown, 9:50 a.m.; Sharon, 10:55 a.m.; Sharpsville, 11:05 a.m.; Pittsburgh, 12:45 p.m. Returning, leave Pittsburgh, 4:48 a.m., 8:33 a.m., and 1:13 p.m. and 4:20 p.m.

11:00 A.M. YOUNGSTOWN & PITTSBURGH Accommodation, stopping at all Way Stations, arriving at Youngstown 1:50 p.m.; Pittsburgh, 6:10 p.m. Trains arrive at Cleveland, 6:50 a.m., 10:55 a.m. 2:00, p.m. 7:00 p.m., and 10:15 p.m.

☞ This is the only route by which passengers can reach Corry, Elmira, Binghampton, New York City, and intermediate points WITHOUT CHANGE. No change to Boston and New England cities.

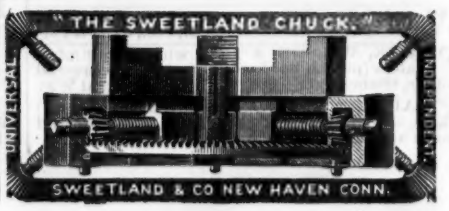
Baggage Checked Through to All Points East

☞ Through Tickets and information regarding the route can be obtained at the Union Ticket Office, corner Bank and Superior streets; at office 131 Bank street, and at new Depot of New York, Pennsylvania and Ohio Railway, South Water street and Viaduct, Cleveland.

A. E. CLARK,
Gen. Pass'r. Agt., Cleveland, Ohio.
M. L. FOUTS,
Pass. Agt., 131 Bank st., Cleveland.

P. D. COOPER,
Gen. Man'gr. Cleveland.

NOTICE.—Hereafter all Passes must be returned to the General Passenger Agent within FIVE DAYS after date of expiration; otherwise they will be discontinued.



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In Pullman Cars, via
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COFFEES AND SPICES
ALSO PROPRIETORS OF THE
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Manufacturers of
Air Furnace Iron.
A full line of Carriage and Plow Hardware kept in stock.
Catalogues for the Trade.

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The only Portable Safety Boiler made.
Unequaled for Economy of Fuel and Repairs.
Also, General Jobbing & Repairs.

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UNION TUBE WORKS, NEWCASTLE, PA.
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LAP WELDED BOILER TUBES
FROM BEST AMERICAN
Charcoal Hammered Iron.

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For Steep or Flat Roofs.
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Manufactured only by the patentee,
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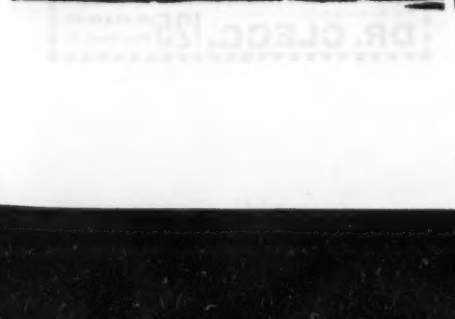

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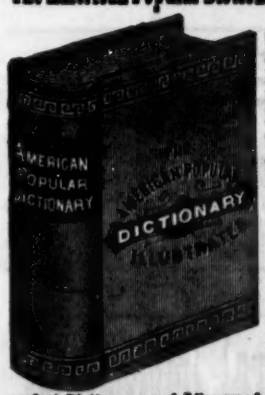

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Proprietors of

ALLIANCE INDUSTRIAL WORKS,

Manufacturers of

STEAM ENGINES,

and Circular Saw Mills.

Specialty of Portable Saw Mills and High Speed Engines.

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The IRWIN & REBER
PATENT
Expanding Water Conductor,
MANUFACTURED BY THE
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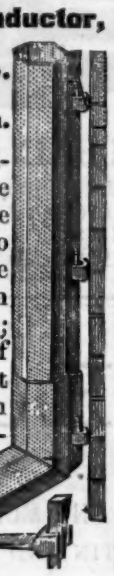
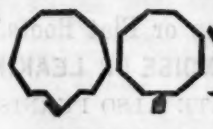
LIMITED,
47 Federal St., Allegheny, Pa.



THE STANDING SEAM allows of an easy and secure fastening, keeping the pipe far enough from the wall to make any overflow from the cave pipe or head, run down the spout, and not the wall; and will open, in case of freezing, so as to prevent bursting, and still remain double-locked and water-tight.



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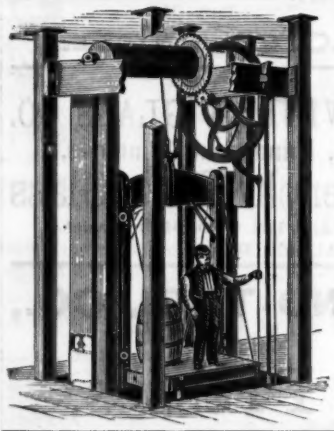

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Chilled Faced R. R. Frogs.

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Nos. 9, 11, and 13 Winter Street.

BOWLER & CO.

Blue Grass Route of Ohio

TIME TABLE.

The Cleveland, Mt. Vernon and Delaware RAILROAD.

GEO. D. WALKER, RECEIVER.

Schedule No. 5--Dating from Sunday, June 4.

SOUTH-BOUND TRAINS.

STATIONS.	Accom	Accom	Expr	Mail	Sunday only
Leave.	P. M.	P. M.	P. M.	A.M.	P.M.
Cleveland	5.30	3.45	2.30	8.50	....
Hudson	6 53	5.02	3.35	10.10	4 20
Cuyahoga Falls	7.11	5.30	3.53	10.29	4 40
Akron	7.23	5.46	4.10	10.42	5 00
*North Portage	P.M.	6.00	4 24	10.54*	6 14
Clinton	.....	6 19	4.44	11.09	5 31
Warwick	.....	6.29	4.49	11.14	5 37
*Marshallville	.....	6.43	5.02	11.27*	5 50
Orrville	.....	6 58	5.14	11.42	6 02
*Apple Creek	.....	7.17	5.32	11.58*	6 22
Fredricksburg	.....	7.32	5.45	12.11	6 37
*Holmesville	.....	7.43	5.55	12.21*	6 48
Millersburg	Accom	7.55	6.08	12.34	7 00
	A. M.	P.M.			A.M.
Millersburg	5.50	.....	6.08	12.34	7 00
*Killbuck	6.02	.....	6.20	12.47*	7 12
*Black Creek	6.13	.....	6.31	12.59*	7 25
Gann	6.33 b 6.53	.....	6.51 7.11 s	1.19	7 47
Danville	7.04	.....	7.20	1.29	7 59
Howard	7.13	.....	7.29	1.38	8 10
Gambier	7.22	.....	7.38	1.47	8 20
Mt. Vernon	7.35	.....	7.51	2.00	8 33
*Bangs	7.45	.....	8.01	2.11*	8 45
*Mt. Liberty	7.53	.....	8.09	2.20*	8 54
Centerburg	8.05	.....	8.18	2.30	9 05
*Condit	8.19	.....	8.32	2.44*	9 19
*Sunbury	8.27	.....	8.40	2.53*	9 28
*Galena	8.32	.....	8.45	2.58*	9 34
Westerville	8.48	.....	9.00	3.15	9 50
Arrive at Columbus	9.15	.....	9.25	3.40	10 20
	A.M		P.M.	P.M.	A.M.

NORTH-BOUND TRAINS.

STATIONS.	Expr	Mail	Accom	Accom	Sundays only
Arrive at	P M	P.M.	A. M.	A. M.	A.M.
Cleveland	1.45	6 55	10.15	8.30	....
Hudson	12.35	5.48	8.53	7.15	10.30
Cuyahoga Falls	12.16	5.30	8.33	6.58	10.11
Akron	12.03	5.17	8.20	6.45	9.50
*North Portage	11.46	5.00*	8.03	A. M.	9.34
Clinton	11.30	4.44	7.46	.....	9.18
Warwick	11.25	4.37	7.37	.....	9.12
*Marshallville	11.10	4.27*	7.23	.....	9.00
Orrville	10.57	4.14	7.10 b 6.40	.....	8.47
*Apple Creek	10.40	3.56*	6.22	.....	8.27
Fredricksburg	10.26	3.43	6.08	.....	8.13
*Holmesville	10.16	3.33*	5.58	Accom	8.02
Millersburg	10.05	3.22	5.45		7.50
			A. M.	P. M.	P.M
Millersburg	10 05	3.22	.....	8 35	7.25
*Killbuck	9 51	3.08*	.....	8.23	7.13
*Black Creek	9.39	2.57*	.....	8.11	7.00
Gann	9.17	2.36	.....	7.49	6 38
Danville	9.07	2.27	.....	7.39	6.25
Howard	8.58	2.18	.....	7.29	6.14
Gambier	8.49	2.09	.....	7.14	6 03
Mt. Vernon	8.37	1.57	.....	7.02	5.51
*Bangs	8.22	1.40*	.....	6.46*	5.37
*Mt. Liberty	8.14	1.31*	.....	6.37	5.28
Centerburg	8.05	1.22	.....	6.28	5.17
*Condit	7.51	1.09*	.....	6.14	5.03
*Sunbury	7.42	1.01*	.....	6.06	4.53
*Galena	7.37	12 56*	.....	6.00	4.47
Westerville	7.20	12.40	.....	5.43	4 30
Leave Columbus	6.55	12.15	.....	5.15	4.00
	A. M.	P.M		P. M.	P.M

* Stop on signal. B Breakfast. S Supper.

Special Round trip rates will be made for Sunday trains.

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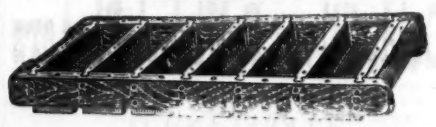

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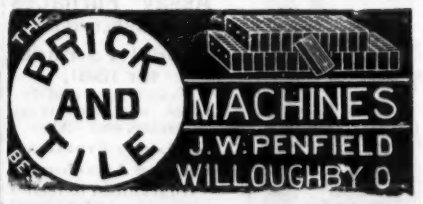
All goods first class. Orders and correspondence solicited. NEW LONDON, O.



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Address F. J. L. BLANDY,
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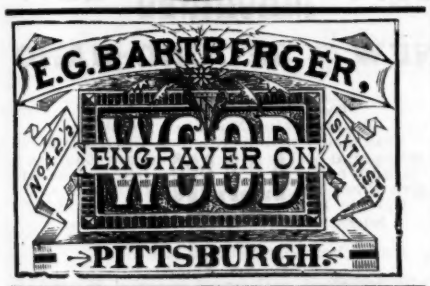

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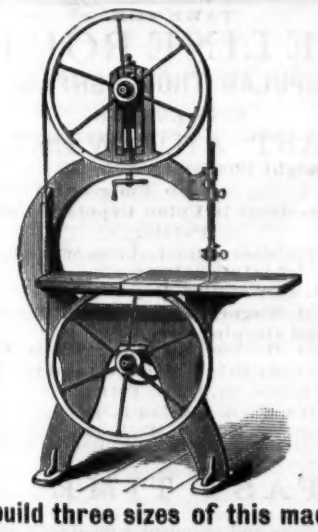

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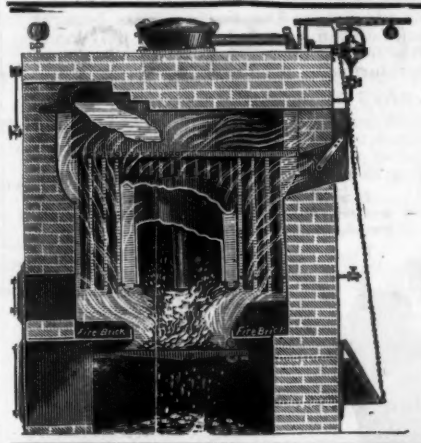

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Patent Steel Tube and Flue Brush.

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Combines the properties of a Scraper and Brush.

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For grinding green, raw bones without any preparation, into Bone Meal, suitable for Stock, Fowls and Fertilizer. Also for Oyster Shells, Guano, Chalk, Lime, Slate and Soapstone, Feed Corn, &c., &c.

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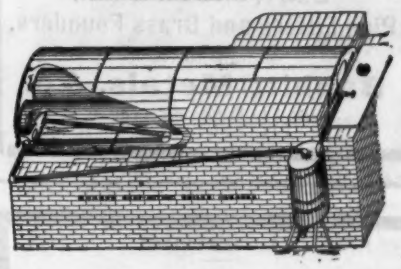

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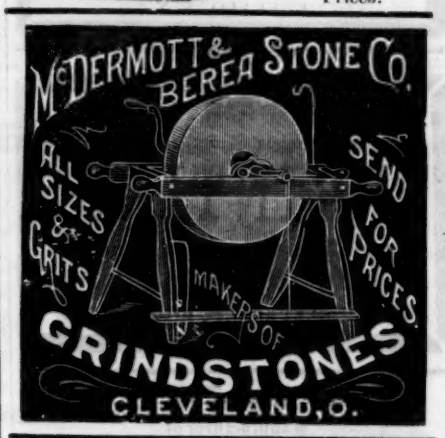
Bran Dusting Brushes and Wire Cloth furnished to order at Lowest Prices.



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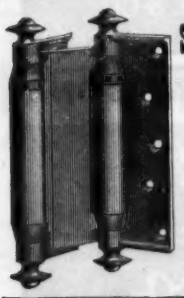

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SPIRAL SPRING HINGE,
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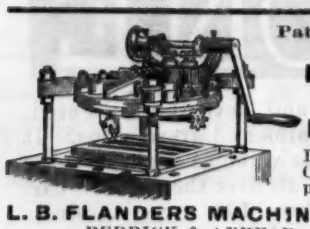

Patent Portable Valve Seat
Rotary Planing Machine
Descriptive Circular on application.
L. B. FLANDERS MACHINE WORKS
PEDRICK & AYRE, PROP'RS,
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New Descriptive Circular on applicatlon

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REQUIRES BUT LITTLE STEAM TO OPERATE IT. PUMPS ALMOST ANYTHING.

Is a real substantial and efficient
DOUBLE-ACTING STEAM PUMP,
Without any mechanical arrangement to absorb power, or get out of order.

NO PISTONS, NO GLANDS, NO CONNECTING RODS, NO CAMS, NO ECCENTRICS, NO STUFFING BOXES, NO FLY WHEELS, NO CRANKS, NO EXHAUST, NO OIL.

THE STEAM IS MADE TO DO DOUBLE DUTY.

Its operation is sustained by steam pressure, brought directly upon the liquid (a cushion of air only intervening) as the forcing elements, while its subsequent condensation furnishes the lifting power.

IT WILL SAVE OVER 50 PER CENT. IN FUEL.

It never gets rusty or deranged, requires no oiling or packing, and requiring no special care, will, on a constant suction, work day and night without attendance—in fact, as long as steam and water are supplied.

It will raise, in combination with water, from 25 to 50 per cent. of mud, sand, gravel, pulp, etc.

From the peculiar simplicity of construction and operation, its compact form, wonderful efficiency and adaptability, great economy and durability, the NEW PULSOMETER has great advantage over all other systems of water elevation.

Every part that sustains any wear is now so constructed that it can be easily removed when worn, and replaced with but trifling cost, and when thus replaced will be as good as new.

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BOSTON OFFICE:
33 Charlestown Street, S. B. Everett, Manager.

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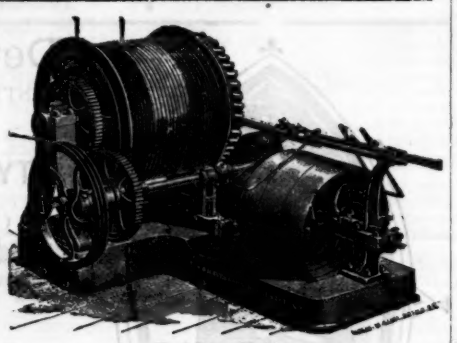
Elevators.



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Cor. Center and Frank Streets,
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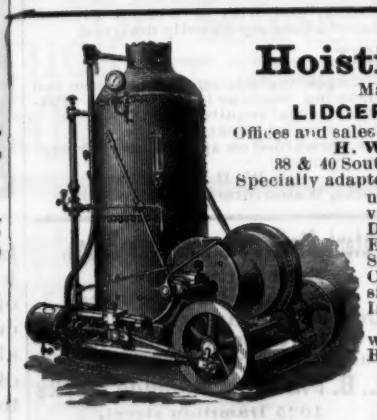

LAKEWOOD, N. Y.

This favorite resort is now entering upon its ninth season, and continues to hold its place in the front rank of summer resorts.

To those who seek rest without stagnation, pleasure without excitement, the delights of rural life without its inconveniences, and the charm of dwelling beside a large body of water, Lakewood recommends itself strongly to favor. A more beautiful spot would be hard to find. With it picturesque cottages surrounded by trees; its velvet lawns sloping down to the lake; the church with its spire; the great hotels with their cool and shady verandahs; and the lake in the foreground, it presents a perfect picture of rural loveliness.

LAKEWOOD, originally called "Lake View," from the extensive view of the Lake and vicinity, is directly on the line of the

New York, Penn. and Ohio Railroad,
(Formerly A. & G. W. R. R.)

On the southern border of Lake Chautauqua, and is not reached by any other railway.

The through New York, Niagara Falls, Boston and Saratoga Express trains pass directly through this beautiful and popular resort, and all trains stop regularly at Lakewood Depot to deliver and take on passengers. Conductors are instructed to give stop-over checks on all through tickets, whether reading good for stop-over or not. This should be understood as giving passengers the right to reach Lakewood in through cars, and when they are ready to resume their journey they can step right into one of

PULLMAN'S PALACE
Drawing Room or Sleeping Coaches,
and go through to
Niagara Falls, Saratoga, New York or Boston.

This cannot be done by any other route, as no other road runs through cars or Palace Sleeping Coaches to or through any place on Lake Chautauqua.

The most complete arrangements have been made for the transportation of passengers to the Sunday School Assembly. Round trip tickets direct to Fair Point (Chautauqua) are on sale in all the principal cities via the **New York, Pennsylvania and Ohio Railroad,** and baggage will be checked to the Assembly Grounds.

For Descriptive Pamphlets, Tickets to Lakewood and return, and to Niagara Falls and return, good for stop-over at Lakewood, apply at Offices of the **New York, Pennsylvania & Ohio Railroad,** (A. & G. W. R. R.) Also at Offices of connecting lines West and South.

TICKETS are now on sale, good for return until September 30th.
A. E. CLARK, Gen'l Pass'r Ag't Cleveland, O.
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